AUTOMOTIVE INDUSTRIES

Vol. 71, No. 6 ▫ THIRTY-SIXTH YEAR ▫ August 11, 1934

August Opens At Fast Pace

First 7 Months' Production Beats Year's Total for '33

by Athel F. Denham
Detroit Editor, Automotive Industries

Production during the first two weeks of August, if maintained, would put the total for the month at over 240,000 cars and trucks. It is to be doubted, however, that this figure will actually be exceeded, and reductions in schedules are to be expected in the next few weeks. The development, however, is in line with previous reported findings that the industry at present is willing to coast along with retail sales.

Production for the week ending Aug. 11 was possibly a shade under that of the preceding week but did not provide an indicator of a downward trend in schedules. However, a certain amount of spottiness has already developed among some producers with several factories apparently working and shutting down in alternate weeks.

Sales from early reports seem to be doing well for this time of year and, apparently, are not off more, if as much, than a normal seasonal drop from July. At closing time no accurate totals of sufficient magnitude were available to form a reasonable index, however.

The preliminary estimate of production by N.A.C.C. members issued monthly by the Chamber confirms closely estimates for July made previously by *Automotive Industries*. The Chamber's estimate for the month is 194,356 exclusive of Ford. The Dearborn manufacturer is estimated to have produced about 70,000, so the industry total for the month was in the neighborhood of 265,000 units, representing a gain of 15 per cent over last July but a seasonal decrease 17 per cent from June.

The July estimate lifts the production total for the first seven months of the year to roughly 2,060,000, as compared with 1,267,310 in the corresponding period last year and 1,985,909 for the full year of 1933. August output according to present indications will bring the 1934

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Under Fire
William Collins, A. F. of L. Organizer in Detroit

Automotive Unions Attacking Collins

Detroit AFL Organizer Latest Target in New Internal Dissensions

William Collins, professional organizer sent here more than a year ago by the American Federation of Labor to unionize the automotive industry, was attacked this week by the Detroit Federation of Labor which includes all A. F. of L. unions in the Detroit area except the automotive locals. Taken in conjunction with the secession during the last week of the Hudson and Olds locals from the Federation ranks, as reported on page 153 of this issue, the attack on Mr. Collins indicates that the dissension in union ranks, which has been commented upon previously in these columns, is growing steadily.

In addition to the numerous charges and countercharges which the present row has elicited, differences of opinion regarding the position of Richard Byrd, labor's representative on the Automobile Labor Board, are being aired once more.

Manufacturers do not know how to view the present dissension in professional labor ranks. Some feel that the A. F. of L. has once more failed to organize the industry and that professional unionism is passing out. Others consider that the fights among the unions may lead to labor disturbances in a competitive race for memberships. Important in this connection is the fact that the Automobile Labor Board is nearing the position of being able to do something about setting up shop committees with proportional representation as envisioned in the President's settlement last spring.

Nine States Gain 40% In New Registrations

July returns of new passenger car registrations from nine states show a total of 23,579, as compared with 16,828 for the same nine states during July of last year. This represents an increase of approximately 40 per cent over July, 1933, for these nine states.

In these nine states Chevrolet leads with 7566, as compared with 6031 last year, an increase of 25 per cent; Ford is second with 6163, as against 3607, a gain of 71 per cent for comparative states in July, 1933; Plymouth is third with 4275, as compared with 2834 in July, 1934, an indicated increase of 51 per cent.

The states from which returns have been received are Delaware, North Dakota, West Virginia, Wisconsin, South Carolina, Utah, Florida, Maryland and North Carolina.

Rising Costs, Price Pressure Effect Profits, Quarterly Statements Reveal

How increasing costs and the competitive pressure on prices have affected profit margins is well illustrated by an analysis of the last six quarterly statements of General Motors and Chrysler.

For the period under consideration, the second quarter of last year was the banner one for General Motors with earnings of $41,198,000, which represent 21.4 per cent on sales of $191,954. This contrasts sharply with the second quarter of this year when earnings were $40,267,000 although sales increased to $303,407,000, a 58 per cent rise over the corresponding quarter last year! The ratio of net to sales in the quarter just ended declined to 13.3 per cent. Moreover, sales in the second quarter of this year gained 48 per cent over the first quarter, but net earnings rose but 37 per cent with the result that in the face of substantial gain in volume the ratio of net to sales actually declined from 14.3 to 13.3 per cent.

The following table shows the record with the quarters arranged in the order of sales volume:

Quarter	Sales (000 Omitted)	Net Profit	Net to Sales
4th, '33	$78,089	$1,804	2.3%
1st, '33	120,000	6,870	5.7
3rd, '33	178,967	33,342	18.6
2nd, '33	191,954	41,198	21.4
1st, '34	205,124	29,320	14.3
2nd, '34	303,407	40,267	13.3

The effects on Chrysler are, in general, similar. Its earnings in the first and second quarters of this year were only 3.5 and 3.6 per cent of sales respectively as contrasted with 9.5 and 8.2 in the second and third quarters of last year when sales were substantially lower than this year. The following table gives the detail for Chrysler:

Quarter	Sales	Net Profit	Net to Sales
1st, '33	$33,059	$3,038d.	...
4th, '33	36,615	191	0.5%
2nd, '33	81,712	7,786	9.5
3rd, '33	87,290	7,190	8.2
1st, '34	95,287	3,304	3.5
2nd, '33	135,817	4,888	3.6

N.Y. Dealers Name Show Committee

At a meeting of the board of directors of the Automobile Merchants Association of N. Y., Inc., held Tuesday, Aug. 7, the following members were appointed to act as the Show Committee in charge of all arrangements for the 1935 New York Automobile Show—Jan. 5 to 12, inclusive: William L. Colt, chairman, Dodge Motors New York, Inc.; Don Ahrens, Cadillac Motor Car Co.; J. R. Barrett, Chevrolet Motor Car Co.; A. E. deLoach, Pontiac Motor Car Co.; Lee J. Eastman, Packard Motor Car Co. of N. Y.; Theodore Luce, Theodore Luce, Inc.; George Stowe, Reo Motor Car Co. of N. Y., Inc.; C. B. Warren, Warren Nash Motor Car Co.; C. K. Whittaker, Studebaker Sales Corp. of America; F. L. Yarrington, Glidden Buick Corporation. G. O. Simons (Ex-Officio), Simons-Stewart Co., Inc., president of the association.

Motorcycle Production Decreased 9% in 1933

A decline of more than nine per cent in world production of motorcycles during 1933 as against the preceding year was revealed in a survey just completed by the Commerce Department's Automotive-Aeronautics Trade Division.

According to reports from the various producing countries, it is estimated that in 1933 a total of 182,186 motorcycles (including three-wheel vehicles) were manufactured as compared with 201,226 units in 1932, 242,977 in 1931, and 351,529 in 1930.

Fire Apparatus Budget of $16,800 Submitted

A budget of $16,800 for the period from Nov. 8, 1933, to Dec. 31, 1934, has been submitted by the Code Authority for the motor fire apparatus manufacturing industry.

The basis of contribution is one-half of 1 per cent of quarterly sales as shown by ledger accounts. Minimum contribution is $25 per quarter, payable quarterly.

GM Seeks Wider Drawback Item From Canadian Border

The Canadian Tariff Board will hold sittings from September 25 to 27, it has been announced by H. B. McKinnon, acting secretary. Among the firms applying to be heard on duty changes is General Motors Products of Canada, Ltd., who will seek widening of a drawback item to include spring steel for use in coil springs in cars.

Car Sales at the Half-Way Mark

Per Cent Increases

Rank 1933	Rank 1934		First Six Months 1934	Six Mos. 1934 Over Six Mos. 1933	Per Cent of Total First Six Months 1934	Per Cent of Total First Six Months 1933
2	1	Ford	295,114	124.0	29.66	19.35
1	2	Chevrolet	268,646	16.6	26.99	33.75
3	3	Plymouth	158,915	59.5	15.97	14.62
5	4	Dodge	49,404	46.1	4.96	4.95
4	5	Pontiac	41,700	—3.2	4.19	6.32
7	6	Oldsmobile	34,329	93.4	3.45	2.60
6	7	Buick	30,968	22.2	3.11	3.71
8	8	Studebaker	22,891	32.4	2.30	2.54
9	9	Terraplane	22,665	45.7	2.28	2.28
10	10	Chrysler	13,052	3.3	1.31	1.85
21	11	Hudson	10,978	416.0	1.10	.26
13	12	Nash	8,413	47.0	.85	.84
14	13	Graham	6,929	35.0	.70	.75
11	14	De Soto	5,633	—40.0	.57	1.38
12	15	Willys	3,183	—64.3	.32	1.30
18	16	Cadillac	2,935	29.8	.30	.33
15	17	Packard	2,805	—41.0	.28	.70
—	18	La Fayette	2,787	...	.28	...
20	19	La Salle	2,759	49.1	.28	.27
16	20	Hupmobile	2,705	—26.0	.27	.54
17	21	Auburn	2,299	—24.0	.23	.44
22	22	Reo	1,897	19.6	.19	.23
23	23	Lincoln	1,059	—10.5	.11	.17
24	24	Pierce-Arrow	934	3.6	.09	.13
25	25	Continental	892	18.5	.09	.11
19	26	Austin	741	—66.1	.07	.32
26	27	Franklin	324	—52.0	.03	.10
—	—	Miscellaneous	164	—85.5	.02	.16
		Total	995,121	45.9	100.00	100.00

Note—See page 182 for monthly classification of sales by price classes and estimates of retail dollar volume.

Hudson-Olds Unions Withdraw from AFL

Independent Organization Started by Secessionists

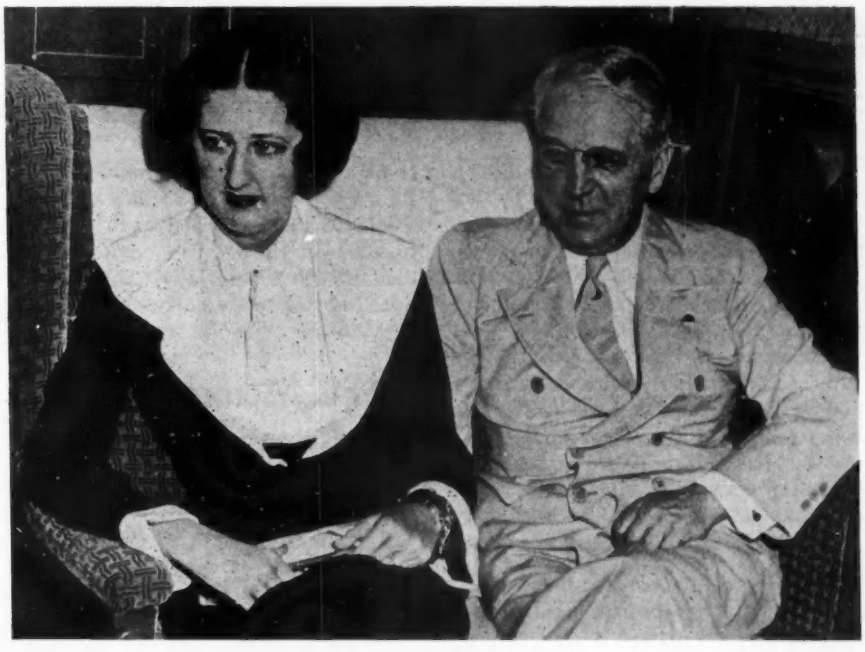
A reaction against domination by professional union executives and against high membership dues charged by the American Federation of Labor, spread last week to two more locals in the automotive industry, one at the Hudson Motor Car Company and one at the Olds Motor Works.

Both of these locals have severed their affiliation with the A. F. of L., and are cooperating in the formation of a new organization—the Associated Automobile Workers of America, an independent organization. While the Olds local is of a relatively minor industrial importance, having but a small and rather inactive membership, the Hudson local, headed by John P. Greer has been decidedly active in the past, and a former bulwark of the A. F. of L. in automotive circles.

It will be remembered that the Hudson local took a leading part in the negotiations last spring leading to the formation of the Automotive Labor Board, and was largely influential in the nomination of Richard Byrd to that board, a representation of labor to which a major portion of the A. F. of L. now is actively opposed.

Breaking away of unions from the A. F. of L. is, of course, not a new development. Its inception was at the time of last spring's labor disturbances when workers at the Chevrolet-Fisher Body plants in St. Louis severed their affiliations to form an independent union.

While personal jealousies and internal politics may have played a part in the severance of affiliations, by far the most important reason therefor is dissatisfaction of worker-members with "what we are getting for the money we pay the A. F. of L."



The New Mrs. Willys

J. N. Willys, well-known automobile manufacturer and former U. S. Ambassador to Poland, snapped in his Pullman drawing room with the former Mrs. Florence Dolan whom he married following his divorce from his first wife.

Kentucky New Car Sales Up 1277 In First 7 Months

July sales in Louisville and Jefferson County, Ky., were below June but neck and neck with July of last year. The total of passenger car sales for July was 655; trucks, 83; total 738. For seven months passenger car sales were 4468; trucks, 563; total 5031. For seven months of 1933 sales were: passenger cars, 3362; trucks, 392; total 3754.

NRA Removes Price Ban In Sales Of Cars to Governmental Agencies

The bars are down on prices in submitting bids for the sale of automobiles to political units, including the Federal, State or municipal governments. Retailers are put on an equality with manufacturers.

This lifting of any ban on price results from an NRA order, issued last Saturday by Division Administrator C. E. Adams in the nature of a stay. The order has the effect of permitting sales of new automobiles to governmental agencies at less than list prices. So far as this business is concerned it suspends Article IV, title B, Section I of the code for the motor vehicle retailing trade. This provision says that "No dealer shall sell a new car at retail to a consumer for less than the factory list prices, plus an amount equal to equipment at listed prices, average cost of transportation, and dealer's actual cost of handling, etc."

It was not made known who asked for the lifting of this provision but Mr. Adams in his order says that "justice requires that appropriate relief be granted from said provision." The order makes effective a recent NRA legal division ruling that on all sales direct to the ultimate consumer both the factory and retailer should be on the same basis.

Chrysler First Half Profit $8,192,084

Gain Nearly Doubles Net Earnings for Six Months' Period of '33

The net profit of the Chrysler Corp. for the six months' period ending June 30 was slightly less than double the figure for the same period of 1933. This year's first-half earnings are reported as $8,192,084 comparing with $4,747,534 for the corresponding time of last year. Sales for the first six months of this year amounted to $231,103,779, which compares favorably with the $114,771,-203 volume last year.

The consolidated balance sheet for the first half of the current year shows current assets including $44,484,283 cash; marketable securities, $4,266,-477; bills of lading with drafts, $10,483,-113; notes receivable, $650,449; accounts receivable, $3,277,641, and inventories, $35,332,657. Current liabilities included accounts payable, $33,296,288; accrued interest, taxes, etc., $675,483; dealers' deposits, $53,217; federal tax reserve, $2,601,329.

'33 Sales 25¾ Billions

According to a report just released by the Bureau of Census, Department of Commerce, retail sales in the United States aggregated nearly 25¾ billion dollars. This total compares with sales in 1929 of more than $49 billion.

Factories Ponder Dealer Demands for Code Aid; Expected to Act as Group

Decision as to factory attitudes towards petitions being circulated by dealers demanding that factories use their franchise cancellation power to enforce the dealer code is understood to have been put up to the National Automobile Chamber of Commerce.

At the present time opinions are being gathered from factory sales executives as to their own feelings in the matter and are being compiled, it is reported for study by the N.A.C.C. executive committee. Whatever decision is taken thus will be regarded as guiding the entire industry.

No action on the petitions apparently will be taken by factories individually, in the meantime.

As to the fate of the petition, it is highly unlikely that the answer will be 100 per cent satisfactory to the petitioners. Factory sales executives contacted indicate personal unwillingness to invoke franchise cancellation.

As one sales executive put it: "We are trying to get sound business men to come into the automobile dealer business. How can we expect them to put up their good money, if they are threatened—the first time they make a mistake—with being forced out of the business (since the petitions ask that no factory sign up a dealer whose franchise has been canceled for code violation)?"

A suggestion heard several times during the last few weeks, however, is that factories cooperate with dealers in getting out used car appraisal data, and that then factories use their normal power in making dealers stick to those appraisals. It is generally believed that if factories were given a hand in formulating appraisal valuations, they would be more inclined to urge dealers to stick to them. It is quite possible that in such a case, however, appraisals would not be based on resale price averages alone.

NAFC Members To Vote On Revised NRA Code

Submission of Re-Drafted Version Expected Within Few Days by Assoc. Heads

From a poll of members of the National Association of Finance Companies the present prospects, according to Milan V. Ayres, association analyst, are that a revised draft of the latest code for the finance industry will be submitted to member companies for assent within a few days.

When the first code for this business was drawn and submitted to NAFC members, considerable opposition developed and difficulties encountered which prevented the adoption and final approval of the proposed code. Last July when General Johnson announced the new NRA policy relative to completing pending codes and imposing a "basic code" on those industries which had not yet assented to their proposed codes a 30-day period was fixed in which uncoded industries either had to adopt their own codes or accept the "basic code," the finance companies were in this category.

Pursuant to that administrative order the NAFC was served with a copy of the revised code for that industry and a copy of the basic code with the request from NRA officials that the industry chose between the two. When these drafts were received, copies were immediately sent to all NAFC members with the request that an opinion as to preference between the revised finance industry code and the basic code be transmitted to the association headquarters immediately.

As soon as member's preferences were known, the results of the poll was communicated to General Johnson and several conferences have been held relative to the revised draft of the code.

D. of J. Rejects Bids On 200 Scout Cars

The Department of Justice has rejected bids received last week on a fleet of 200 scout cars. This action is said to be due to the lifting of the price formula covering bids on business of federal, state and local governments as reported on page 153 of this issue.

The Department stated:

"The whole situation is a big tangle. We are going to ignore all the bids received last week. Then in a month or so we will start all over again and call for new bids."

The impression has been given that the department expects to get lower prices as the result of the order or that before asking again for bids President Roosevelt will have taken some action on his order of June 29 holding that it would be no violation of codes to submit bids as high as 15 per cent under code prices.

There also was a report that the department threw out the bids because of the possibility of the Ford Motor Car Co., and the NRA patching up their quarrel which would permit the Ford company to bid on government business. At present it is barred because of failure to submit certificates of compliance. Reports heretofore have been circulated that the Ford company and NRA were about to make peace, but they proved to be erroneous.

These veteran Oldsmobile employees have a combined service record of 226 years. The old timers are gathered about a single cylinder Oldsmobile produced in 1903

L. A. Young Said to Have Purchased D. J. Ryan Co.

According to current reports, L. A. Young and associates of Detroit have negotiated for the purchase of the D. J. Ryan Foundry Co., in Ecorse, Mich. However, the transaction was not complete up to press time. It is understood there was to have been a meeting Thursday afternoon, at which time all details of the transaction were expected to be completed.

Two Amendments to Used Car Section of Retail Code Get Tentative N.R.A. OK

Two amendments to the used car sections of the motor vehicle retail code have been submitted to NRA by the National Control Committee, and it is reported that they have been accepted without public hearing and are now being prepared for submission for the Administration's final approval.

An amendment authorizing a mark-up on freight equal to the new car discount has been rejected by NRA as has the one modifying which employees are entitled to cars at a discount.

Also under consideration is an amendment clarifying the situation on discounts on parts and cars to fleet owners. This amendment is still in the formulative stage and it is understood that discussions with the factories on the subject are under way. The necessity for this amendment was created by the decision that the agreement on this question reached last January with the factories was not authorized by the code.

In addition to the used car amendments, NRA is understood to have approved tentatively an amendment to the code providing that State Advisory Committees might require from members of the trade affidavits covering every new car transaction. This amendment, it is felt, will facilitate enforcement.

Budgets submitted by the code authority are still being analyzed by NRA, but it is anticipated that the budgets of some states will be approved next week with others to follow in short order.

The two used car amendments which have been tentatively approved cover title and possession, and consignment. On the question of consignment, NRA ruled some time ago that the code did not bar a dealer from accepting a customer's car for resale and if the selling price should prove higher than the guide book allowance, crediting the customer with the actual selling price on the purchase price of a new car. The trade took the position that this ruling increased the difficulties of code enforcement since it was held to open the door to subterfuge. It was contended that under no circumstances should the buyer get more for his used car than the guide book allowance. It was to make this viewpoint effective that the consignment amendment was submitted.

The title and possession amendment was designed to clarify the confusion that exists as to allowances on used cars accepted on new car sales for future delivery. The code authority wants the code amended so that a used car allowance shall not be made in excess of the guide book figure at the time the dealer takes title and possession of the used car except when a bona fide order is placed: (a) with a cash deposit of at least 5 per cent of the factory list price of the new car; (b) with a purchase order from a responsible company ordering for its own requirements; (c) in case bids on the business of the government or responsible companies are not awarded until the next subsequent guide book has been issued. These exceptions apply only when the dealer is unable to make the delivery for reasons over which he has no control. When he is able to make delivery, he must offer to do so immediately.

Plaintiff Withdraws Suit Against GM & Chevrolet

The Payne Motor Co., New York City dealer, has withdrawn its action against General Motors and Chevrolet in which an injunction was asked under the Shackno Act, New York's NRA statute, restraining the corporation from alleged violation of the Motor Vehicle Retail Code, according to a representative of the attorneys for the Payne company. A temporary injunction had been issued in the case on which a hearing was to have been held this week.

Although no statement has been made, it is believed that the decision to drop the action followed the announcement by NRA late last week that prices quoted on cars for national, state and local governments would not be subject to the price maintenance provisions of the motor vehicle retailing code. As a result of this ruling, conditions are restored to pre-code status, and either manufacturers or dealers may offer cars at any price they choose on government contracts.

The Payne company's original plea was based on a charge that the corporation had offered to sell about 50 cars to the city at prices below those established by the code.

A.A.A. Rules Committee Meets Monday in Detroit

The Rules Committee of the American Automobile Association meets Monday (Aug. 13) in Detroit to determine rules and regulations for next year's Indianapolis classic. One of the important questions to be settled will be whether this year's allotment of 45 gal. of fuel will be continued. It is reported that some feeling exists that this quantity should be further reduced.

Col. Eddie Rickenbacker, chairman of the committee, will preside. Prominent among other issues on the agenda is the question of numbers of starters which will be allowed. This year the number was cut from 42 to 33 cars.

Rear Engined Racer Wins German Grand Prix

One of the new Auto-Union rear-engined racers with Hans von Stuck at the wheel won the Grand Prize of Germany race on the Nuerburg Ring track in the Taunus Mountains on Sunday, July 15. The race consisted of 25 rounds over the 14.15-mile winding course and was, therefore, of a total length of 354 miles. Stuck's time for the race was 4 hours 38 min. 19.1 sec. which gives an average of 76.4 m.p.h. Second place was secured by Fagioli driving a Mercedes, and third by Chiron, a member of the famous Scuderia Ferrari (Ferrari Stable), driving one of the new Alfa Romeo cars. There were eight Alfa Romeos in the race, four Maseratis, three Mercedes, three Auto-Unions and one Bugatti. Three of the Alfa Romeos belonged to the Ferrari Stable. Six cars finished within the time limit, a seventh also finished but was not officially placed, and the rest were flagged off the course.

One of the remarkable features of the race was the speed with which tire changes were effected on the Mercedes. The complete set of tires was changed and the fuel supply replenished in exactly 60 seconds. Fuel was pumped into the tank positively by means of an electric pump instead of being poured in.

Rear-engined Auto-Union racing car

Road & Automotive Engineers Urged to Cooperate on Accidents by Indianan

Highway and automotive engineers must work out their designs for highways and motor vehicles together before any real progress can be made in lowering the toll of lives and property damage taken in traffic accidents on the highways, John W. Wheeler, member of the State Highway Commission of Indiana, stated in a recent address. Under present conditions the highway and bridge plans now on the drafting boards will in all probability be obsolete by the time the road or bridge is constructed, he said.

"Truth of this statement has been proved in the past," Mr. Wheeler continued. "This condition, a lack of coordination of highway and motor vehicle designing, was contrasted with the cooperative designing of railway equipment and tracks. The engineers who designed the new streamlined trains knew exactly the degree of curves and grades, the weight of the rails, the kind of ties and nature of ballast on the roads on which these trains would operate. On the other hand the automotive engineer has no idea of the plans of the road designer, and the highway engineers have no idea of what the automotive engineer is designing for his next year's model.

"Curves and grades on an important State highway built in 1924 were satisfactory then because the average speed was 30 miles an hour while the same thing is true of a highway built in 1931 when the average speed was 40 miles an hour. Both of these highways are in excellent shape today but are hazardous because of changes in the motor vehicles using them.

"No matter how many conferences are held; no matter how drastic traffic rules, or how many police are appointed, as long as the automotive engineer puts 120 miles an hour under the hood, the boys and girls and some of their fathers and mothers will get 120 miles an hour out of that car. There is a very definite line of demarcation between that speed at which we can control a car and the next higher speed bracket at which the driver is practically helpless when a crisis arises.

"The speed of an automobile can only be regulated in its design on the drafting board and until we set a maximum speed and design the automobile and the highway for that speed, our death and accident record will increase in spite of all that we can do to prevent it."

Conn. Survey Reveals Average Highway Speed

Average speeds of 41.2 m.p.h. for passenger cars; 34.2 m.p.h. for trucks, and 43.1 m.p.h. for buses were found to prevail on Connecticut highways through a traffic survey begun last fall in which more than 45,000 vehicles were clocked. The survey revealed that out-of-state cars tended to travel at higher speeds than local cars and that the up-hill rate is faster than the down grade speed. Speed, it was discovered, has a tendency to drop between nine and 10 o'clock at night and on Sundays up to five o'clock in the afternoon.

The survey was conducted by the transportation committee of Yale University, the Eno Foundation for Highway Traffic Control, Inc., the Federal Bureau of Public Roads and the Connecticut State Highway Department. A speed detector perfected by Professor Charles J. Tilden, Strathcona Professor of Engineering Mechanics at Yale and president of the Eno Foundation, was used in the survey.

Canadian Car Financing Dollar Volume Jumps 77%

Financing of June automobile sales in Canada showed a substantial increase over the corresponding month of the previous year and two years ago, according to Government figures just released. The expansion was evident not only for new automobiles, trucks and buses but also for used vehicles, and applied to the dollar amount involved as well as to the quantity.

The number financed in June was 10,483 compared with 6,623 in the same month of the preceding year and 9,151 in June, 1932. The amount of financing was $4,247,782 against $2,401,149 last year, and $3,470,450 in 1932. Compared with last year the June totals showed a gain of 58 per cent in quantity and 77 per cent in dollar volume. For the first six months there were 40,846 cars financed for $16,632,144, as compared with the first half of 1933 when 31,146 vehicles were financed for $11,514,813.

C. E. Hayes Representing Tyson Agency in Penna.

C. Ellis Hayes has been appointed a special representative for Pennsylvania and adjacent territory for the O. S. Tyson and Company, New York; Tyson-Rumrill Associated, Rochester, and O. S. Tyson and Company, Inc., Philadelphia, advertising agency. His office will be at 3701 North Broad Street, Philadelphia.

Mr. Hayes will carry on special work for the agency's clients and do general sales and contact work for the Tyson organization throughout the Pennsylvania territory.

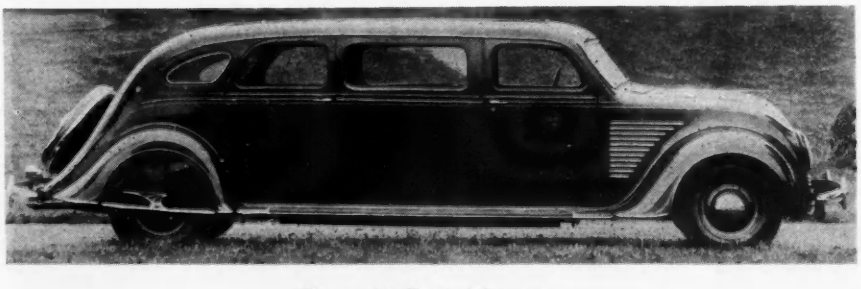
Mr. Ford Talked About V-8 Motor

We are advised by an official of the Ford Motor Co. that the statement attributed to Henry Ford in our issue of July 28 which quoted him as saying that he was considering the production of a V-9 motor for streamlined trains. Mr. Ford talked about a V-8 motor. We regret exceedingly this ridiculous error which, of course, was obvious to our technical readers.

May Gasoline Consumption Increases 7.87% Over '33

An increase of 107,894,000 gallons of gasoline during May of this year over the same month of 1933 is reported by the American Petroleum Institute in the Statistical Bulletin. This represents an increase of 7.87 per cent. During May the total consumption was 1,478,567,000 gallons, with a daily average consumption of 47,696,000 gallons. This compares with 1,370,673,000 gallons for May of last year with a daily average consumption one year ago of 44,696,000.

For the first five months of this year the total gasoline consumption is reported at 6,270,292,000, with a daily average of 41,525,000 gallons against a total of 5,716,355,000 gallons with a daily average of 37,857,000 for the first five months of 1933.



First Airflow Hearse

Built by Chrysler Corp. on special order of western funeral director. Casket is placed in vehicle from side.

Would Raise Minimum Retail Tire Prices

Trade Code Authority Makes Recommendation; Some Retailers Opposed

Slight increases in the minimum retail prices of automobile tires were asked last week by manufacturers and distributors at a public hearing before NRA. Establishment of differentials between the several distribution classifications of the retail trade also were urged. The application for the modification was made by the Code Authority of the retail rubber tire and battery industry, but the specific changes suggested were presented by A. L. Viles, chairman of the Code Authority of the rubber manufacturing industry.

The changes suggested by the tire manufacturers calls for average price increases of 9.18 per cent above the existing floor levels. Using the standard suggested as 100, passenger car tires in "group A" would be increased from 77½ to 85, a 9.6 per cent increase; "group B" would move from 70 to 75, a 7.1 per cent rise. Truck tires in "group A" would move from 79 to 86¼, an increase of 9.5 per cent; "group B" truck tires would rise from 71 to 78, another 9.5 per cent jump. Tubes in "group A" would go from 70 to 77, an increase of 10 per cent, and "group B" tubes would be raised from 60 to 66, also a 10 per cent increase.

These proposed floor levels would apply to all brands of tires except Firestone High Speed, General, Goodrich Silvertown, Goodyear All Weather and U. S. Royal, which it is recommended carry 5¼ per cent higher prices.

Considerable opposition developed to the maintenance of minimum prices. Representatives of retailing organizations and several individual retailers, principally in the mass distributing group, appeared at the hearing to oppose the suggestions and in several instances recommended that minimum price levels be abolished. Two representatives, in particular, associated with large chain organizations in Philadelphia and Chicago, testified that their companies had lost between 50 and 60 per cent of their tire profits since the fixing of price levels.

Correct Show Dates

PHILADELPHIA—It was stated in July 28 *Automotive Industries* that the New York and Chicago 1935 automobile shows would be held simultaneously. This is incorrect. The New York show will be held Jan. 5 to 12 and the Chicago show dates are Jan. 26 to Feb. 2.

John M. Spangler
Newly appointed general sales manager of National Carbon Company

Recognize Commercial Body Code Authority

Recognition by NRA of the following duly chosen members of the Code Authority for the commercial vehicle body industry was announced last Saturday:

W. J. Barry, Jr. of Barry & Baily Co., Philadelphia, Pa.; Wm. B. Gibson of Wm. B. Gibson, Ltd., San Francisco, Cal.; Al. Goldfarb, president of John C. Dix Son & Co., Inc., Memphis, Tenn.; T. H. Monahan of Providence Body Co., Providence, R. I.; F. B. Platt of Erlinder-Platt Body Corp., Chicago, Ill.; Henry G. Schaefer, vice-president of the Gustav Schaefer Co., Cleveland, Ohio; G. K. Specht, vice-president of Hercules Products, Inc., Evansville, Ind.; Henry Wiegers, secretary-treasurer of Veenema & Wiegers, Inc., Paterson, N. J. and A. H. Andrews, secretary and executive officer, Union City, N. J.

Directors Elect Bradley to GM Executive Group

Albert Bradley, vice-president of General Motors, was elected a member of the corporation's executive committee at a meeting of the Board of Directors, on Aug. 6.

GM Declares Extra Dividend of 50¢

Corp. Feels $20,000,000 Melon Will Be Stimulant to Business in General

An extra dividend of 50 cents per share, calling for a disbursement of more than $20,000,000, has been declared by the General Motors directorate. This is in addition to the regular distribution of 25 cents per share payable Sept. 12 to stockholders of record Aug. 16. At the same time the GM directors voted the regular $1.25 dividend per share on the $5 preferred stock which is payable Nov. 1 to stockholders of record Oct. 8.

Alfred P. Sloan, Jr., president, in commenting upon the action of the directors, stated:

"With respect to the extra dividend, the board had before it several considerations. Earnings for the first half of the year, as already reported, were in excess of the regular dividend for the entire year, plus the extra now authorized. The financial position of the corporation continues strong, justifying an extra disbursement at this time. Again, the distribution of over $20,000,000, the amount of the extra dividend, will not only be of benefit to the stockholders, but passing into the channels of active trade will act as a worthwhile stimulant to business in general. That is the thinking which prompted the action."

Gorey Joins Wheels

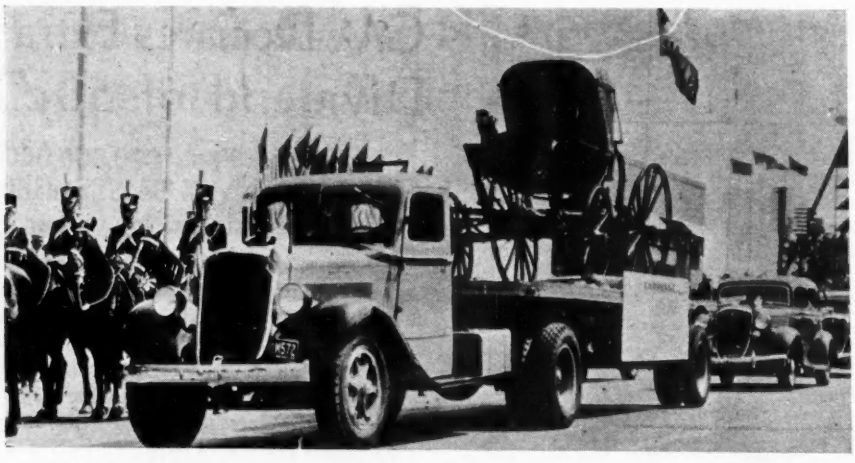
Joseph C. Gorey, formerly president of Gorey Automotive Parts, is now associated with Wheels, Inc., as special representative, according to a recent announcement made by the latter organization. Mr. Gorey will specialize in the sales of replacement parts and assemblies to fleet operators.

Roberts May Have Maintenance Trade Code Ready For Approval This Week

Shorn of its cost recovery provisions, a code of fair competition for the automotive maintenance trade is being pushed aggressively by NRA Deputy Administrator Jo Roberts who hopes to have it ready for approval by Aug. 12.

It is expected that the code initially will contain only the mandatory provisions, wage and hour sections, and simple trade practices. Later it may be reopened to insert some sort of price protection. Although a provision requiring members of the trade to keep their individual prices available for public inspection has been considered, it is regarded as doubtful that it will be incorporated in the approved draft.

While the trade is getting organized to administer its code, it is planned to appoint a temporary administrative committee under the supervision of NRA pending the election of a permanent code authority. It is anticipated that the necessary organization work will take about 45 days.



The carriage that Gen. Marquis de LaFayette used on his tour of the United States in 1824-1825 was loaned to the Chicago Historical Society last week by Paul G. Hoffman, president of The Studebaker Sales Corporation of America. Above you see the carriage before the World's Fair Administration Building

Maintenance Show Planned for Sept.

New Association And Publication To Sponsor Conference and Exhibit

A National Trade Recovery Conference and Exhibit will be held at the Stevens Hotel, Chicago, Sept. 11-14, under the auspices of the International Garage and Maintenance Association, formed by a merger of the International Garage Association and the National Automotive Maintenance Association, and the new organization's official publication, the Garage and Maintenance Counselor, according to the announcement just released by the sponsors. Manufacturers of products purchased by garages and repair shops are invited to take exhibition space.

Apparently written before NRA's announcement that it was pushing the new Maintenance Code through for early approval, the organization has invited all divisions of the automotive service trades to "participate in the formation, organization and execution of a vigorous program of self-government as a substitute for Code regulations." As previously reported, trade practice sections of the Storage and Parking Code have been stayed by NRA so that all that remains in effect are the wage, hour and collective bargaining sections. While NRA has reversed itself and included the maintenance trade in the general automotive division under Jo G. Roberts, deputy administrator, the trade practice sections of the Parking Code, however, have not been restored.

According to present plans the new association is to be financed through subscriptions to the Garage and Maintenance Counselor. This publication formerly was the Garage Counselor and Sales Builder. The subscription price is to be $2 of which $1 will go to the national association, 50 cents to State and local associations and the remaining 50 cents to the publication.

Highway Users Report On Fees and Taxes Released

The National Highway Users Conference has just released the 1934 edition of its analysis of registration fees and special taxes for motor vehicles, giving this data by states.

Wisconsin Axle Co. Wins Patent Suit

The suit brought by the Wisconsin Axle Co., a subsidiary of the Timken-Detroit Axle Co., against the Automotive Parts Co. has been decided in favor of the plaintiff, according to the following statement issued by the plaintiff:

"In the suit of the Wisconsin Axle Co. vs. The Automotive Parts Co., Equity No. 4792, the District Court of the Northern District of Ohio has entered an order holding contributory infringement has occurred and an injunction has been issued under the seal of that Court enjoining and restraining The Automotive Parts Co. of Cleveland, Ohio, from making, using or selling bevel gear sets, axle shafts, or any replacement parts or elements usable for rebuilding axles made in accordance with patent No. 1,571,801 and with Claim 2 of patent No. 1,730,900 and from infringing upon or contributing to the infringement of said patents.

"This suit was brought by the Wisconsin Axle Co. as a test case against The Automotive Parts Co. for the purpose of securing an adjudication on the right to prevent unauthorized use or sale of these parts made by others than the Wisconsin Axle Co., to be used in such patented axle combinations with the above stated results."

GM's World Sales Pass Last Year's Total in First Seven Months of '34

Unit sales of the General Motors Corporation to dealers in the United States and Canada plus overseas shipments numbered 884,600 in the first seven months of 1934 as compared with 605,540 in the corresponding period last year and with 869,035 for the full year of 1933. The fact that the corporation has now sold more units than it did in all of last year is due entirely to a phenomenal increase in its foreign business since domestic volume, while ahead of the corresponding period last year by a large margin, has not as yet reached the 12-month total for 1933.

In all three categories—sales to U. S. users, sales to U. S. dealers and world sales to dealers—July volume showed a seasonal decline from June but was the largest for that month since 1930. Domestic retail sales in July numbered 101,243 against 112,847 in June and 87,298 in July. In the first seven months, sales to U. S. consumers totaled 596,215 against 487,062 in the same period last year and 755,778, the 1933 full year total.

Sales to U. S. dealers in July amounted to 107,554 as compared with 118,789 in June and 92,546 in July, 1933. The seven months' total in this category was 700,421 as compared with 520,308 last year. Since total sales to U. S. dealers in 1933 amounted to 729,201, there is no doubt that General Motors will pass last year's mark for domestic business during the current month.

Comparison of the data on sales to U. S. consumers and dealers shows that dealer stocks increased in July for the seventh successive month. The increase in stocks amounted to 6311 units as compared with a gain of 5248 in the same month last year. Since Jan. 1, G. M. dealer stocks have increased 104,206 units as compared with an increase of 33,246 in the same period last year.

World sales to dealers (including the U. S.) were 134,324 in July as compared with 146,881 in June and 106,819 in July, 1933. Foreign business during the month alone amounted to 26,770 against 28,092 in June and 14,372 in July last year. Total foreign sales in the first seven months were 184,179, more than double the 85,232 sold last year in the corresponding period.

A summary of the corporation's monthly sales report follows:

	July, 1934	June, 1934	July, 1933	Seven Months 1934	Seven Months 1933
Sales to U. S. Consumers	101,243	112,847	87,298	596,215	487,062
Sales to U. S. Dealers	107,554	118,789	92,546	700,421	520,308
World Sales to Dealers	134,324	146,881	106,918	884,600	605,540
Foreign Sales	26,770	28,092	14,372	184,179	85,232

Chevrolet Will Build Md. Assembly Plant

Chevrolet has announced acquistion of a site near Camp Holabird in Baltimore for construction of a new assembly plant with a capacity of 80,000 cars and trucks annually. It is proposed also to erect a Fisher Body plant adjacent to the new Chevrolet plant to supply it with bodies. The plant, as usual, is designed by Albert Kahn and will furnish employment to approximately 1500 men when completed. No date of completion has been announced.

N.Y. Bill Would Reduce Gross Vehicular Weight

A bill has been introduced in the New York Senate which would amend the present law law regulating gross weight of vehicles by reducing the wheel weight (when equipped with pneumatic tires) from 11,200 lb. to 9000 lb.; the weight on one axle from 22,400 lb. to 18,000 lb.; the weight on any two consecutive axles of a vehicle or combination of vehicles would be left at 36,000 lb., regardless of axle spacing; the weight on three or more consecutive axles would be reduced from 30,000 lb. to 28,000 lb. plus 750 lb. per foot, distance between first and last axles; a four-wheel vehicle would be permitted 28,000 lb. gross instead of 36,000 lb.; a six-wheel single unit would be permitted 38,000 lb. instead of 44,000 lb. and a vehicle with eight wheels or more would be permitted 40,000 lb. instead of the present 50,000 lb.

Studebaker 6% Notes Must Be Deposited by Aug. 31

Aug. 31 has been set as the final date for the deposit of all outstanding 6 per cent notes of the Studebaker Corp., due Dec. 1, 1942, with the creditors' committee headed by former United States Senator Walter E. Edge. As of July 27 $6,548,875 of the $14,861,100 outstanding had been deposited with the committee.

Principal of all the notes outstanding has been declared due Sept. 19, 1932.

Merger Rumors Persist; Indications of Early Settlement Remain Lacking

Merger discussions among independent automobile companies which have been widely rumored in the industry of late are found by *Automotive Industries* to have reached no promise of satisfactory settlement as yet. It is probably dignifying these discussions too much to designate them as yet as actual "negotiations," but they do represent a growing recognition among independent car manufacturers of the possibilities in affiliations in the way of reducing not only design and production costs, but particularly costs of distribution.

The stumbling-block to consummation of actual mergers at present appears to lie mainly in the direction of the personalities involved. It is recognized that, to be effective, new combinations must be headed by only a few individuals at the most, with these individuals in complete control. Selection of the men to guide the destinies of any of the new combines suggested, which, in the speculating, has Auburn, Pierce-Arrow and Reo as a nucleus, is, as usual, a difficult political problem.

With the new-model season rapidly approaching, moreover, it is evident that any mergers if they are to be made effective for 1935 would have to be rushed through within the next 60 to 90 days at the very latest. It seems highly improbable at present, although still possible, that the various problems involved can be solved sufficiently rapidly to permit an actual functioning of a new organization by that time.

Another of the difficulties confronting the completion of actual mergers is a division of opinion as to the desired extent of such mergers. Apparently there are two groups among the leaders in the discussions—one desiring an affiliation of at most three companies, the other desiring a combination of a large number of independents for the formation of another "General Motors" or "Chrysler Corp."

The latter type of merger appears highly unlikely of consummation at least this year. The former still has a chance, the way things look at present. In the meantime, however, almost every independent car manufacturer has been approached with the merger idea in mind by one or the other of the two groups.

Sooner or later, undoubtedly, something will come out of these discussions. Apparently additional money seems to be available to car companies who can show effective operating prospects as the result of combination. With some of the independents at present close to financial bedrock, that prospect undoubtedly will have a major influence on keeping the discussions alive for the next few months at least.

Bohn Predicts Piston Eliminating All Slaps

Charles B. Bohn, president of the Bohn Aluminum & Brass Corp., predicts the advent of a new aluminum-alloy piston in which the thermal expansion is so closely controlled that the initial or cold clearance can be made so small that there is no possibility of piston slap during the warming-up period and yet no danger of seizure under severe operating conditions. While the test work is said to have been practically completed, the probable date at which the new piston will be available to engine manufacturers is not mentioned.

August Opens Fast

(*Continued from page* 151)

total pretty close to the 2,300,000 mark. With four months to go, estimates published early this year placing production for the year at about 2,750,000 bid fair to be realized if not exceeded.

The July estimate of output for N.A.C.C. members of 194,356 compares with 228,513 in June and 177,080 in July last year. In the first seven months Chamber members produced 1,472,832 units, as compared with 982,257 in the same period last year.

Chevrolet announced that July retail deliveries, including export and Canada, aggregated 86,570 units.

Plymouth reports for the same month sales exceeding June totals by some 700 units. Plymouth July production was 35,195.

Hudson reports that during the first six months of the current year the company sold 40,982 cars, as compared with 40,831 for the whole of 1933. This is the first time since 1925 that Hudson's first half sales have exceeded the total for the preceding year.

Six Months' Earnings

Vehicle Companies	1934	1933
12 Companies Reported	+$56,821,005	+$36,638,233
Chrysler Corp.	+ 8,192,084	+ 4,747,534
Mack Trucks	+ 180,980	— 482,110
Total—14 Companies	+$65,194,069	+$40,903,657
Other Automotive Companies	**1934**	**1933**
25 Companies Reported	+ $8,569,019	— $1,088,166
Gemmer Mfg. Co.	+ 45,819	+ 16,003
Wright Aeronautical Corp.	+ 476,403	— 75,109
Reynolds Spring Co.	+ 169,827	+ 60,244
Moto Meter	+ 368,339	+ 16,227
Total—29 Companies	+ $9,629,407	— $1,070,801

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

The improvement in general business continued last week, although steel operations fell off and car loadings were lower. On the other hand, there was an upturn in electricity and bituminous coal production. The improvement in wholesale and retail trade was maintained.

Freight Decreases

Railway freight loadings during the week ended July 28 totaled 608,848 cars, which marks a decrease of 6,016 cars below those during the preceding week, a decrease of 35,991 cars below those a year ago, but an increase of 97,745 cars above those two years ago.

Food Prices Gain

Retail food prices during the two weeks ended July 17, according to the Bureau of Labor Statistics, advanced 0.3 per cent. The improvement in prices that began in the latter part of April has brought the current average up to 109.9 per cent of the 1913 level.

Improved Farm Prices

The index of farm prices compiled by the Department of Agriculture stood at 80 on July 15, the highest recorded since June, 1931, as against 77 on June 15 and 76 a year ago. The improvement in farm prices is attributed to a downward revision in yield estimates and acreage reductions.

Current Consumption Gains

Production of electricity by the electric light and power industry in the United States during the week ended July 28 was 1.3 per cent above that in the corresponding period last year.

Crude Output Drops

Average daily crude oil production for the week ended July 28 amounted to 2,547,350 barrels, as compared with 2,592,800 barrels for the preceding week and 2,697,850 barrels for a year ago. The current figure exceeds the Federal allowable level by 17,050 barrels.

Fisher's Index

Fisher's index of wholesale commodity prices during the week ended August 4 stood at 77.9, as against 77.8 the week before and 78.1 two weeks before.

Federal Reserve Statement

The consolidated statement of the Federal Reserve banks for the week ended August 1 showed very little change. Holdings of bills bought in the open market, discounted bills, and government securities remained unchanged.

Per Capita Wage Loss of 1.6% Noted in June

An average per capita decrease of 1.6 per cent in weekly earnings of factory workers during June is reported by the Bureau of Labor Statistics. The decrease in the automotive industry was 8.4 per cent, and decreases noted in other major industrial groups, including textile, heavy duty equipment, etc., ran as high as 11.5 per cent. However, these larger decreases were offset by corresponding increases in numerous smaller groups, thus bringing the general average down to a negligible figure.

Weekly earnings of factory employees averaged $19.51 during the month according to Commissioner Lubin who issued the report. Based upon reports supplied by more than 17,000 manufacturing organizations, man-hour data showed a drop of 2.2 per cent in average hours worked each week during the month in all companies, and an average increase of 0.5 per cent in hourly earnings. Increases in average hourly earnings of factory workers have been shown by the bureau's reports for every month since July, 1933.

Black Still Preferred

Black remains the predominant color choice of new car buyers according to the Duco Color Advisory Service of the duPont Co. Green, according to this organization, has advanced to third place in popular favor and ranks next to blue in buyers' choice.

General Tire Employees Get $1,000 Life Policy

Every employee of The General Tire and Rubber Co. has just been presented with a $1,000 life insurance policy, the premiums for which will be paid entirely by the company, it was announced by William O'Neil, president. This includes about 2200 persons in factory, office and branches.

The company also will share with employees, who care to take advantage of it, the cost of group accident and health insurance, which provides weekly payments for disability resulting from sickness or non-occupational accidents, Mr. O'Neil said. New employees will be eligible for this insurance upon the completion of six months' service.

Air Transport Industry Budget Fixed at $18,350

NRA has announced that the Code Authority of the air transport industry has submitted a proposed modification to the industry's approved code and also has asked Administration approval of a budget to cover code administration expense.

The proposed modification deals with code changes necessary to empower the Code Authority to meet expenses of administration. The sum of $18,350 is specified in the proposed budget as necessary to cover the period from Jan. 1, 1934, to Dec. 31, 1934. The basis of contribution by industry members would be division of the total budget into four equal parts to be collected quarterly from the entire industry by an assessment levied on a percentage of gross revenue from air line operations for the preceding quarter, large enough to collect the quarterly quota.

French Parliament Repeals Automotive Luxury Tax

One of the last acts of the French Parliament before its recent adjournment was to repeal the luxury tax under which the French automobile industry professed to suffer severely. Private passenger cars were subjected to a 6 per cent and commercial vehicles to a 3 per cent tax. The idea of a luxury tax on commercial vehicles seems a bit incongruous, but possibly the standpoint of the legislators responsible for it was—if they can't pay the tax on motor vehicles, let them use hand carts! The general sales tax of 2 per cent remains on the products of the motor industry as on all other merchandise.

Motor Fire Apparatus Amendment OK'd by NRA

NRA has approved an application by the Code Authority of the motor fire apparatus manufacturing industry for a modification of its code by rewriting the section authorizing the Code Authority to establish a budget for administration purposes and a basis of contribution to same by industry members. The approval became effective August 9 unless, meanwhile, good cause to the contrary is shown to the Administrator.

Car Registrations In 17 Big Cities

June Sales Range from 5% Loss to 57% Gain Trade Assoc. Reports

New car registrations for June in 17 principal cities of the United States, exclusive of New York City, ranging from a decrease of 5 per cent in the case of Kansas City to an increase of 57 per cent in Baltimore is reported by the Automobile Trade Association of Maryland. In the January to June totals no decreases are reported, but increases range from 2½ per cent in Kansas City to 106 per cent in St. Louis. The increases and decreases reported are compared with 1933 totals both for the month and the first six months of this year.

The cities and totals reported by the Maryland organization follow:

	June		Jan. to June	
	1934	1933	1934	1933
Baltimore ...	1,560	992	6,411	4,349
Buffalo	2,022	1,399	9,015	7,039
Chicago	6,431	4,444	30,161	22,584
Cincinnati ...	1,627	1,424	6,765	6,035
Cleveland	3,998	2,750	15,844	10,029
Dallas	1,088	791	4,908	2,984
Detroit	7,917	7,344	38,492	22,839
Indianapolis .	1,565	1,073	5,728	4,084
Kansas City..	806	847	4,767	4,664
Los Angeles .	4,950	5,135	23,893	20,542
Milwaukee ..	1,695	973	6,844	3,838
Philadelphia .	3,309	2,709	13,367	10,442
Pittsburgh ...	3,279	2,632	12,899	8,568
Rochester	1,039	902	5,033	3,896
St. Louis	2,225	1,500	14,478	7,023
Syracuse	671	578	3,111	2,504
Toledo	1,034	685	4,454	2,316

Dealer's Sentence Under N. Y. Shackno Act Upheld

The sentence of three months in prison for non-payment of a $500 fine imposed on Gordon S. Harris, New York retail automobile dealer, following his conviction on charges of violating the Shackno act, New York's NRA enabling law, has been upheld by Supreme Court Justice William Harman Black.

Justice Black ruled that it was "a reasonable construction" of the law to impose a jail sentence for non-payment of the fine. Harris' contention is that he is not liable to a prison term because the Shackno act provides no such punishment. However, Justice Black has released Harris in $2,000 bail pending an appeal from his ruling.

GM Reported Considering New Montreal Building

Erection of a new headquarters building on Atwater Park, Westmount, to accommodate all the Montreal district services and activities of the General Motors Corporation of Canada, Ltd., may be started early next spring for completion in October, 1935, it is reported. The proposed building would be three stories and basement, and would be planned to contain retail automobile showrooms for all General Motors products, large gasoline and service station, offices, storage and warehousing accommodations. Present tentative plans have been prepared by General Motors engineering staff, it is understood, although at least one Montreal architectural office has prepared preliminary sketches.

H. F. W. Burstall

The death is reported from England of Professor H. F. W. Burstall, who had a prominent part in the development of the scientific theory of the internal combustion engine. After having spent some time in the United States and Canada, around the turn of the century, he organized the Department of Mechanical Engineering of the University of Birmingham, of which he became the head, a position he retained until 1925. Professor Burstall was a member of the Gas Engine Research Committee of the Institution of Mechanical Engineers, whose researches were emobdied in reports printed in 1898, 1901 and 1908. He also contributed a number of papers on topics connected with internal combustion engines to the meetings of the Institution.

July Living Costs Show Slight Rise

Living costs increased 0.04 per cent from June to July this year, but the average was still 20.9 per cent below the high of July, 1929, according to the National Industrial Conference Board.

The purchasing power of the dollar during July was 126.4 cents as compared with 139.9 in April, 1933, and 100 cents in 1923.

Studebaker Exports Exceed 3 Yr. Totals

Improvement Extends to Pierce-Arrow and White Lines A. L. Frank States

Studebaker exports this year already exceed the totals for each of the entire years of 1930, 1931, 1932 and 1933, according to Arvid L. Frank, vice-president and general manager of The Studebaker Pierce-Arrow Export Corporation.

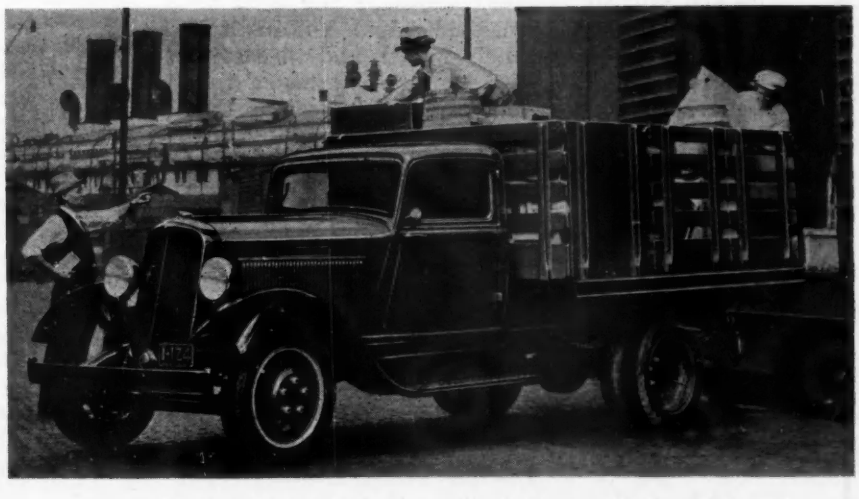
"The gains to date by the Studebaker lines are as follows: Studebaker passenger car sales now are ahead of the 12-month totals for 1930, 1931, 1932 and 1933; Studebaker truck shipments already exceed the total for every other entire year in the company's history. Pierce-Arrow car exports have passed the totals for each of the entire years of 1932 and 1933. White truck and bus sales now surpass the yearly totals for 1931, 1932 and 1933.

"A continuation of our present volume of business for the remainder of the year will bring our total close to 1929 performance," Mr. Frank stated.

Issue Repair Data Book

A flat rate radiator repair price data book covering passenger cars, trucks, buses and tractors, has been issued by the Trenton Auto Radiator Works, Trenton, N. J. The operations for which minimum recommended prices are given include recoring with cellular type, recoring with tubular type, removal and reinstallation of radiator, minimum for radiator repair, and minimum price for boil out and minor repair.

New 1½ Ton Dodge Truck



Low-priced series added to Dodge line. Chassis lists at $490 for 131 in. and 136 in. wheelbase. Also comes in 148 in. and 161 in. base listing at $520 f. o. b. factory

The Horizons of B

THE President is returning to find the administration forces slightly shaken by the impact of adverse circumstances and sadly in need of his leadership. The difficulties are threefold, first a decline in business well in excess of seasonal expectations, secondly a languid and faltering stock market apparently headed for lower levels in the face of disheartening profit prospects for the fall and finally a crop of ugly strike thistles from the benign seeds of section 7A.

Bachelors and Business

The decline in business has been met with the customary circumvention of the public official. Its existence was denied. On a Monday morning some three weeks ago Leon Henderson, chief of NRA research summoned to his office the Washington contingent of the Fourth Estate and to the confusion of every other statistician in the land proved that business was bounding and ebullient. He cited the sale of household rugs and the decline in bachelor resistance to conjugal entanglements. The scribes consulting other and more prosaic weathervanes of business such as freight car loadings, check transactions, steel operations, electric power consumption, cotton forwardings and automobile output found that various weighted combinations of these showed a drop of from 5 to 12 per cent depending upon the index used.

A Blow to Buying Power

The security markets in terms of volume and values reflected the uncertain state of business. Common stocks listed on the New York Stock Exchange showed a decline in aggregate value from the spring peak to the end of July of $6,600 million, roughly about 18 per cent of their total value. Since individuals and institutions often reckon their wealth and therefore indirectly their buying power in terms of the current quotations upon their possessions the effect of such a decline upon the popular inclination to spend cannot be underestimated.

Kennedy Hyde and Pecora Jekyll

Chairman Joseph P. Kennedy of the Securities Exchange Commission in a radio broadcast on July 25 undertook to lighten the elegiac mood of the markets. Among many other kind things he said "Financial enterprises require profit to keep them going. There is not the slightest thought of eliminating or restricting profits." However it seems that the new commission possesses a Jekyll and Hyde personality. The following day the malevolent Dr. Ferdinand Pecora Jekyll shook a threatening finger at the market for incubating false war rumors to no good end. Aside from the flaming headlines in all the newspapers, the assassination of Dollfuss, the concentration of 40,000 Italian troops on the border and sundry other equivocal circumstances there was absolutely no foundation for these rumors.

A Brain Trust Syllogism

In the field of labor the country has been harassed by an interminable series of strikes many of then involving bloodshed, the loss of lives, the suspension of civil authority and a paralysis of commerce. At least one conspicuous member of the Brain Trust professed open gratification over labor's unrest. The reasoning was simple and final. Past recoveries were attended by strikes. The country is now suffering from a perfect epidemic of strikes. Therefore recovery is making excellent progress. The rest of the country has been able to confine its rejoicing.

The attitude of labor is both puzzling and disappointing. Business, barring the exceptions which establish the rule, has cooperated in good faith with the administration in its attempt to spread work. The steel industry, for example, at the end of June was employing practically the same number of workers as at the peak in 1929 although operations were only half as great. Wages per hour rose 35 per cent during the past year and total labor expense was up 66 per cent. The automobile industry makes an equally creditable showing.

The New Deal's Gifts to Labor

General measures of wages, payrolls and employment offer impressive evidence of labor benefit. Average weekly wages according to the National Industrial Conference Board rose from $14.53 in March, 1933, to $20.71 in June. The Federal Reserve Board's index of payrolls mounted from 36.9 to 65 in the same interval. The American Federation of Labor has just reported total unemployed for the month of June accompanied by the customary expressions of dissatisfaction. It seems that 10,312,000 men and women are still out of jobs. However this is a reduction of 3,377,000 in the course of sixteen months. It ignores the 1,813,000 workers on various federal relief jobs. Mr. Green holds that these chaps are unemployed. Perhaps he bases this contention on the amount of work these men have been observed to turn in rather than the fact that they are on Uncle Sam's payroll and are paid in legal tender.

Business

by Joseph Stagg Lawrence

THE economic horizons of the automotive industry comprehend the whole panorama of business. In large measure the prospects of the nation's largest manufacturing industry are determined by the ebb and flow of business generally. It is for this reason that Automotive Industries is broadening its service to its readers by inaugurating a new weekly feature—The Horizons of Business—in which Joseph Stagg Lawrence will report and discuss major happenings of interest and importance to automotive executives in their individual jobs.

Governmental policies are always of major consequence to business—and that is truer today than ever before. Consequently objective comment on them is inevitable if a well-rounded job of the sort Mr. Lawrence is undertaking, is to be done. It should be emphasized, however, that neither Mr. Lawrence nor Automotive Industries has any political axe to grind. Moreover, since governmental policies which affect business almost always have controversial aspects, it is expected that at times there will be disagreement with Mr. Lawrence's views. In fact, it is conceivable that on occasion Automotive Industries itself may disagree. We feel, however, that Mr. Lawrence's great ability and the reputation for soundness which he has built for himself, qualify him entirely for the role of an independent commentator which he is assuming on these pages. Even if the individual reader may at some time disagree, he will surely find Mr. Lawrence's comments interesting and thought provoking. The latter of these two consequences alone will make these pages worth while.

Since the President assumed office the total unemployed have been reduced 38 per cent. For every two new jobs provided by business the government has contributed one. When combined with the Railroad Pension Act passed in the closing days of Congress, the solicitous official regard for labor's feelings, the packing of labor boards exercising a quasi judicial function with men bearing a professional labor stamp it is a record which should invite the gratitude of labor and secure its cooperation.

These three problems then, business, the security markets and labor have been bungled by inept or partisan subordinates and in a critical stage await the attention of the master healer. Of the three, business is the most important and labor the most imperious.

Uncle Sam as a Power Baron

When the President arrived on the west coast he was met with an impressive retinue of government officials, the staff of the New Deal G.H.Q, and a mountain of fervent mail asking the chief executive to pause in various communities and smile on next fall's voters for the benefit of deserving local Democrats. The President at once commenced his tour. He paused at the Bonneville Dam on the lower Columbia where the government is preparing to enter the power business in the Northwest on a gigantic scale. When this joint project, the Bonneville and the Grand Coulee, is completed it will produce as much power as the entire Pacific coast is now consuming. There have been no complaints that the power facilities of the far west have been inadequate.

The action of the government in entering the power field on a large scale has been an enigma to many students of federal policy. Capitalism has always been taken severely to task by Brain Trust critics for its alleged planlessness and for its prodigious and rather stupid multiplication of productive capacity in the presence of a demand which did not justify it. Hence one of the cardinal principles of social control has been the restraint of capacity to produce.

Protecting the Investor

At another point the power policy of the government shows a fine Emersonian contempt for consistency. The public has been assured solemnly, frequently and colorfully that Uncle Sam would protect it against the big bad wolves of Wall Street. The financial district was charged with the losses of millions of innocent investors effected in two ways, deception and manipulation. To the accompaniment of reverberant tom-toms a willing Congress passed first the Federal Securities Act to force promoters to tell the truth, the whole truth and nothing but the truth and second the Securities Exchange Control bill which would forever shackle the wicked speculator. Mind you the purpose was to prevent the lamb from losing his fleece. No calculated act could injure the owners of utility securities more than the appearance of the government on the scene as a competitor—a statement fully demonstrated by the market action of the utilities.

Origin of Power Policy

The administration owes its power policy to Professor Bonbright of Columbia University the President's advisor on utility matters while governor of New York. It is Professor Bonbright's conviction that regulation of the utilities through state commissions is futile. The only effective check upon the utilities, maintains the Columbia scholar, is government competition. That is what the President had in mind when he said at Bonneville "—the principle of government needs yardsticks so that the people in this country will know whether they are paying the proper price for the electricity of our times." All the government must now do is to establish confidence in the integrity of its own calculations. Timid voices suggest some consideration for security owners and existing power capacity.

Steel Orders Slow; Operations at 25%

Finishing Mills Looking To Labor Day To Start New Model Specifications

Tail-end requirements for current models serve to tide both sheet and strip mills over the prevailing lull in the steel market. Many finishing mills are operating at what is generally looked upon as the irreducible minimum, with hopes running high that initial orders for steel for new models will begin to come through immediately after Labor Day.

In several lines of finished steels the low point in activity is believed to have been left behind. A further decline of from 26.1 per cent last week to 25.8 per cent of ingot capacity in operation this week, reported by the American Iron and Steel Institute, reflects disparity in the operations in the different steel districts and, what is generally thought, to be the final stage of the recession. Detroit is holding its own, Chicago and Pittsburgh accounting for the greater part of the slight dip. Even at these points somewhat of a turn in finishing mills' activities is noted already.

Scrap Buying Revives

The non-integrated rollers are working up stocks of semi-finished material which they had previously contracted for and which, in large part, has been made in July. Before long, however, primary mills should be operating at a rate closer to that of finishing mills. Much is being made of a revival in the buying of scrap by steel mills.

While still frequently referred to as barometrical, scrap purchases are more often than not an indication that the purchasing agents of the steel mills consider the time ripe for taking advantage of inviting offers by brokers. Code or no code, steel producers still buy that part of their raw material which they do not produce themselves, and among which scrap is perhaps the most important, only when they are convinced that sellers' asking prices offer bargain opportunities.

Pig Iron—Buying by automotive foundries consists of occasional single cars. Prices are unchanged.

Aluminum—At a metting of the Non-Ferrous Foundry Association for Industrial Recovery, scheduled to be held at Chicago next month, classification of aluminum alloy castings as to weight and intricacy and uniform cost estimating as well as standard trade customs are to be discussed. (Editor—Bismarck Hotel, Chicago, Sept. 19-21.) The market for virgin as well as secondary aluminum is unchanged.

Copper—"Blue Eagle" copper continues to be quoted at 9 cents, delivered Connecticut. The c.i.f. Hamburg, Liverpool or Havre is around 7¼ cents. In the "outside" market, the nominal quotation is 8⅛ @ 8¼ cents, delivered Connecticut point. The Copper Code Authority has announced that under certain conditions holders of stocks may participate in sales.

Tin—London and Singapore markets were closed on Monday, a Bank holiday. Spot Straits was nominally quoted at 51.70 cents at the week's opening here.

Lead—Unchanged. Some storage battery manufacturers are beginning to cover their next month's needs.

Zinc—Quiet and firm.

Industrial Appeals Board Organizes With Few Rules

The new Industrial Appeals Board convened on Wednesday of this week for the first time under rules which NRA described as "so simple and so few that it is indeed to be the little fellows' forum conceived by National Recovery Administrator Hugh S. Johnson."

Reviewing the Administrator's purpose in creating the board, its members, Chairman Amos J. Peaslee, Monsignor John A. Ryan and John S. Clement, in the organization meeting decided to assure the "little fellow" whether he appears individually or as a minority group a full opportunity to present his complaint by:

All formality beyond that which requires submission of a complaint in writing and a showing that the complainant has made every reasonable effort to obtain satisfaction through routine NRA channels, is to be eliminated.

Upon that basis the board expects to devote its principal attention to complaints which already established agencies—division or deputy administrators or Code Authorities—have been unable to handle and its entire program has been planned to expedite the recommendations which it will make to the Administrator.

Out of the dozens of complaints which have been routed to the board since its creation, analysis has disclosed only 15 which properly fall within its jurisdiction.

Uruguay Plans 500 Pesos Fee On All Imported Cars

A bill presented to the Uruguayan Congress on Aug. 1, 1934, proposes to limit importations after Aug. 5 to products covered by import licenses to be issued by the Exchange Control Commission, consideration being given to shipments under prior contract, according to a cable of Aug. 2, from Charge d'Affaires Leon Dominian, Montevideo.

The measure is reported to form part of a plan to reduce imports and to divert trade to countries constituting Uruguay's principal customers, in an effort to balance imports against exports. It is to be accompanied by a decree, effective immediately, abolishing compensated exchange and providing for the distribution of free exchange by countries.

The projected law also provides that automobiles imported after Aug. 1, will pay a national license fee of 500 pesos each, in addition to the usual local license.

De Soto Wins First Prize In Nervi Automobile Show

The Airflow De Soto, competing against numerous American and foreign made cars, was awarded first prize at the automobile show held recently at Nervi, Italy. Awards were made on the basis of beauty, style and design.

This is the second European prize for De Soto in major automobile shows abroad this year. The grand prize in the aerodynamic class was awarded the De Soto at the Concours d'Elegance at Monte Carlo.

CALENDAR OF COMING EVENTS

SHOWS

American Transit Assoc., Cleveland, Ohio ..... Sept. 22-27
Cleveland (Automotive Service Industries) ..... Nov. 19-23
New York Automobile Show.... Jan. 5-12
Chicago Automobile Show.... Jan. 26-Feb. 2

MEETINGS

American Chemical Society, Cleveland, Ohio ..... Sept. 10-14
American Welding Society, New York City ..... Oct. 1-5

ANNUAL MEETINGS

Natl. Assoc. of Motor Bus Operators, Cleveland ..... Sept. 21-22
Natl. Safety Council, Cleveland, O.. Oct. 1-5
Institute of Traffic Engineers, Cleveland ..... Oct. 2-3

CONVENTIONS

American Society for Metals, New York City ..... Oct. 1-5
American Transit Assoc., Cleveland Sept. 24-27
International Foundry Congress, Philadelphia ..... Oct. 22-26
American Foundrymen's Assoc., Philadelphia ..... Oct. 22-26
National Foreign Trade Council, New York ..... Oct. 31-Nov. 2

EXPOSITION

Natl. Exposition of Power & Mechanical Engineering (Biennial) New York, N. Y. ..... Dec. 3-8

JUST AMONG OURSELVES

They Won't Look Alike in 1935

WITH moderately revised models already announced by many makers within the last month or so, it now seems likely that there will be few revealments of definitely new 1935 lines before late fall. Early summer models having been unusually numerous, early fall announcements seem likely to be fewer than usual.

A few days in Detroit already has convinced us that there will be more face-lifitng noticeable on 1935 lines than has been common in recent years. The Man in the Street will be able to distinguish the 1935 from the 1934 models of almost every automobile without the aid of a magnifying glass or an engineering guide book.

Body and radiator styles are going to be especially interesting next year, because no single car in 1934 seems to have monopolized public favor from an appearance standpoint sufficiently to make it the direct progenitor of next year's crop.

* * *

Would a Barebones Special Have a Chance?

EVERY so often the "economy" car idea bobs up again. The frilless, comfortless, slightly cramped, bare-bones-of-transportation vehicle smoulders everlastingly as an ideal in the minds of some automotive men.

All reasoning on the basis of what people really need and ought to want leads inevitably to conclusion that success awaits the producer of such a vehicle. But logic, which must include an understanding of what people want rather than of what they ought to want, still overcasts such a vision with a fog of economic uncertainty.

One executive told us recently that he thinks such a car would sell widely at $50 to $75 less than the lowest priced car now on the market. We think that the spread would have to be at least $150 to give the Barebones Special a fighting chance.

* * *

Decentralization Might Pay Its Way

WHEN we actually saw with our own eyes the old barn fitted up as a machine shop at the Ford exhibit in Chicago, it was impressed on us that Henry Ford really is serious about his idea of producing some car parts in small quantities at scattered places throughout the country. He really believes that his one-foot-on-the-soil-and-one-foot-in-the factory theory may be made to work.

While the old barn exhibit didn't convey any new facts to our mind, it did inspire a new emotional understanding of the realities of the project.

The plan still seems to have its difficulties, but the vitality of the concept radiated by this little exhibit is so great as to create a feeling that the obstacles *might* be overcome. We can think of nothing so interesting at the moment as a rather detailed exposition by Mr. Ford of how some phases of the movement might be worked out in the case of his own plants—with some specific examples for illustration.

Decentralization of labor masses, for one thing, might result in steadier employment for the country as a whole and might reduce the economic ravages caused by big strikes in areas where labor concentration is high. The economic loss caused by one major strike might well equal the added costs of decentralized production over a very long period of time.

* * *

A.L.B. Generally O.K. With Workers

THE routine of handling small labor dispute problems, based on cases of individual complaint, makes no mean drain on the time of really important executives in automotive plants. When a case actually has to be tried before the Automobile Labor Board considerable detailed work is necessary to prepare the factual data needed for the hearing. But in the process useful executive education on labor problems is taking place.

Personal investigating of recent weeks has impressed us with the fact that there is less real dissatisfaction among automobile workers than one might judge from reading newspapers. As nearly as we can determine the number of cases actually brought to the Automobile Labor Board, including many very minor ones, has been very small in proportion to the total number of workers in the industry. A majority of the discrimination cases carried to the Board seem to have been settled by the employee having been taken back to work before any official trial took place.

The Automobile Labor Board, in other words, seems to be functioning very satisfactorily from the standpoint of those who have individual grievances. Its detractors can almost certainly be counted among those whose primary objective is union recognition or some other principle rather than merely the obtaining of justice in itself.

—N.G.S.

Production of Airflow Bodies

by Joseph Geschelin
Engineering Editor, Automotive Industries

PRACTICALLY every trick in the master welder's repertory has been adopted in the fabrication of Chrysler and DeSoto Airflow bodies, particularly on the unique front section. That this is no idle boast is evidenced by the fact that we find in this operation a variety of processes including electric arc welding, oxy-acetylene welding, spot welding with both fixed and portable equipment, indirect welding, flash welding, and the Chrysler method of hydromatic welding.

The massive Airflow front section is possibly one of the most complex structures ventured in body building and involves a great multiplicity of small pieces as well as large stampings which are integrated in the welding department. For convenience we have covered in this article only a few of the high spots of the new hydromatic operations. Really to appreciate the manufacturing problem and the skill with which it has been handled, it is necessary to go through every step and observe how each welding method has been adapted to fit the special need.

Briefly, it may be noted that the front section has been broken down into certain elements or sub-groups,

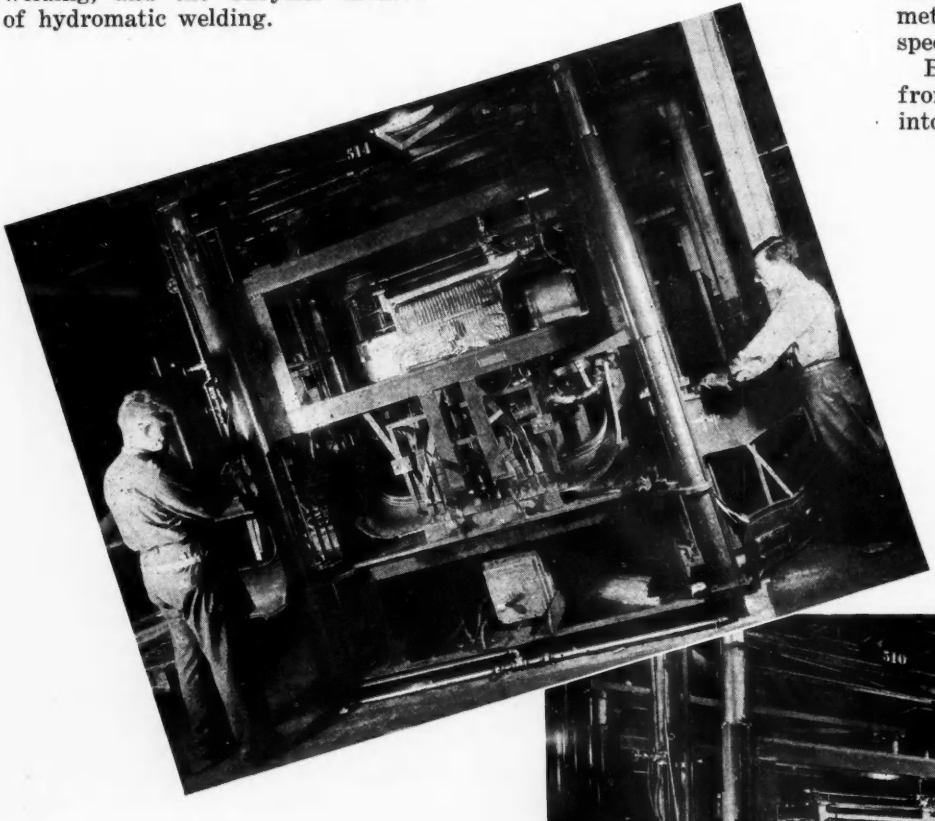


Fig. 1—(Left) This machine produces 50 spots around the cowl ventilator openings and for reinforcing brackets at the top section. The automatic timing device is seen at the top center of the machine with the small tubes radiating to the guns, one bank of which may be seen in the foreground working on the top section

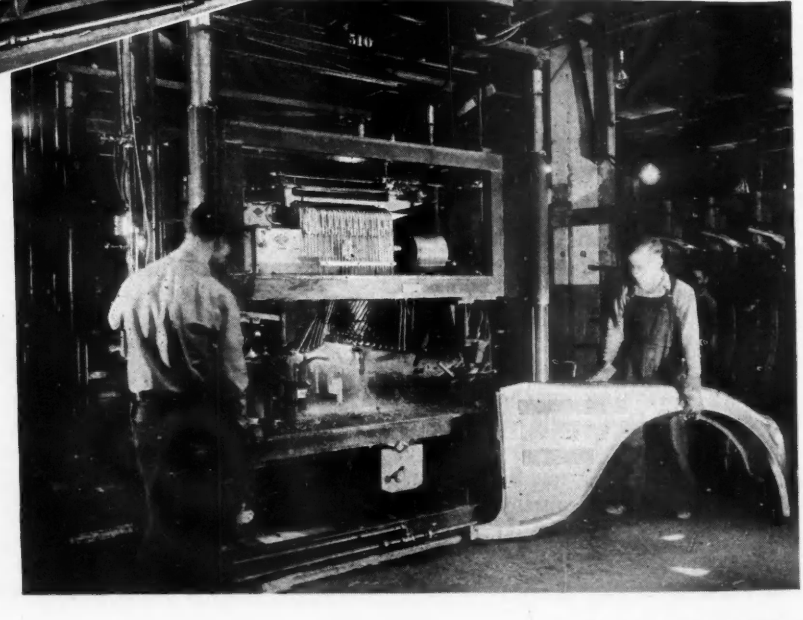


Fig. 2—(Right) Action photograph shows the welding of 32 spots on the front outside wheel and cowl panel. The operator is holding a completed panel. The automatic timing device is in the top center as in Fig. 1. Some of the quick-acting clamps for fastening the work in the fixture may be seen in the foreground.

Demands Utmost of Welding Art

each handled separately; then welded into sub-assemblies, and finally fitted into the main assembly. In the subgroups might be included such units as the pillar, instrument panel, dash panels, ventilator lids, peak panel, small assembly, and inside and outside side panels.

The instrument panel, particularly, comprises a great number of small parts such as brackets, lugs, bosses, and whatnot, that are arc-welded in place in the usual manner. These and other arc-welding operations are housed in suitable booths studding the body shop.

The hydromatic welder, easily the most spectacular piece of equipment in the Chrysler body shops, is an exclusive development embodying certain features of spot and projection welding, in combination with an unique hydraulic and electric control which makes the welding cycle entirely automatic.

The welding element consists of a single bank or a number of banks of individual welding guns, each one communicating with an automatic timing device which controls the hydraulic pressure as well as the current flow. The automatic control and the guns are suitably disposed about the special welding fixtures designed for the individual operations, with the guns permanently fixed at the proper point either horizontally, vertically, or in inclined positions. This arrangement assures precision in location and welding speed of an unusual order.

Hydromatic welders are so designed that the act of opening a single master hydraulic valve, after the work is securely fixed in the machine, brings the head or heads into

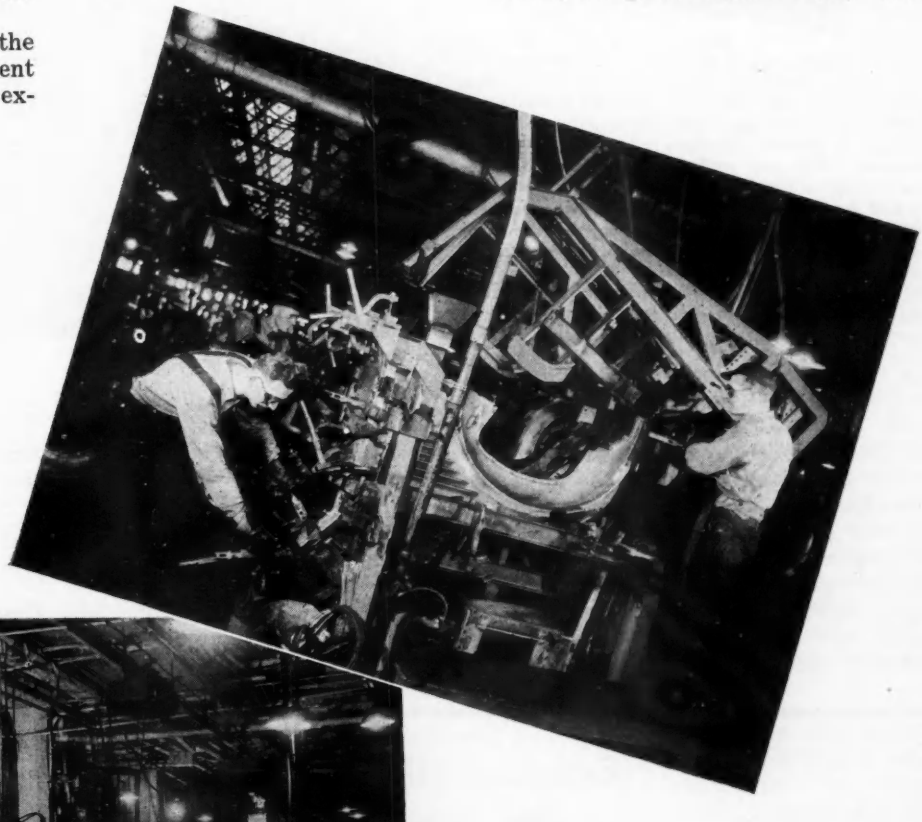


Fig. 3—(Right) Here is the master templet for aligning the front inside and outside panels. The panels are clamped into position and with gages locked at 43 vital points to assure alignment. After the fixture is securely locked, the panels are tack-welded together with an electric arc.

Fig. 4—(Left) 188 spots, 94 on each side, produced in this hydromatic welder help to weld the front section into a practically indestructible unit. This machine, probably the largest hydromatic welder in the Chrysler organization, handles the joints around the front wheel housing contour as well as along the front door post. One row of guns may be plainly seen at the right. In the background at the left, welding mechanics are making some additional tack-welds on the unit just as it leaves the operation in Fig. 3 and prior to the operation just described

Fig. 5—(Left) Preceding views have shown some of the high spots in the production of the front section—this one offers a striking contrast. Here is the familiar and relatively simple operation of flash-welding the side and back panels into the integral rear section

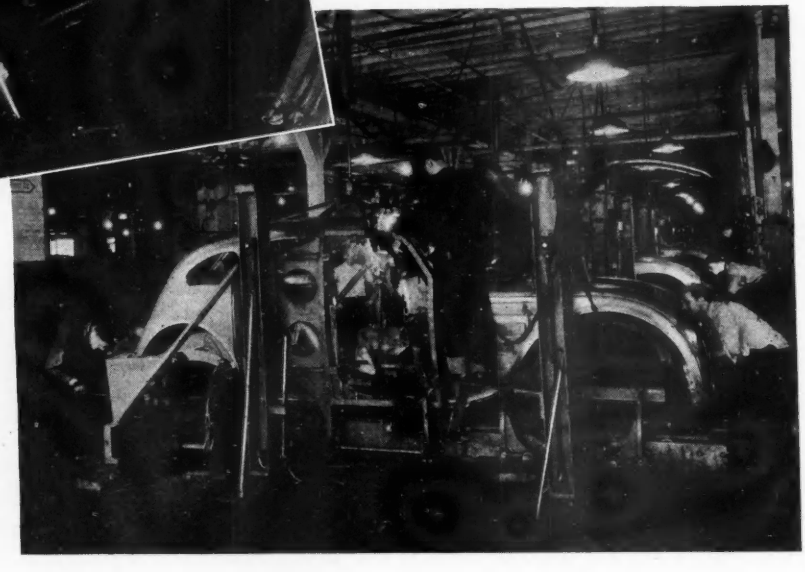


Fig. 6—(Right) Final welding is accomplished in the massive framing fixture, which is a part of a battery of fixtures extending into the background. In this operation, the front and rear sections are brought together, accurately aligned and securely clamped while the roof and door openings are maintained in precise alignment. Note the heavy hinged frame that serves to control door dimensions; a similar purpose is served in the roof opening by the fixture suspended from the air hoist.
With all alignments secure, the joints at the roof and sill sections are arc-welded with a generous bead, completing the strong all-steel structure

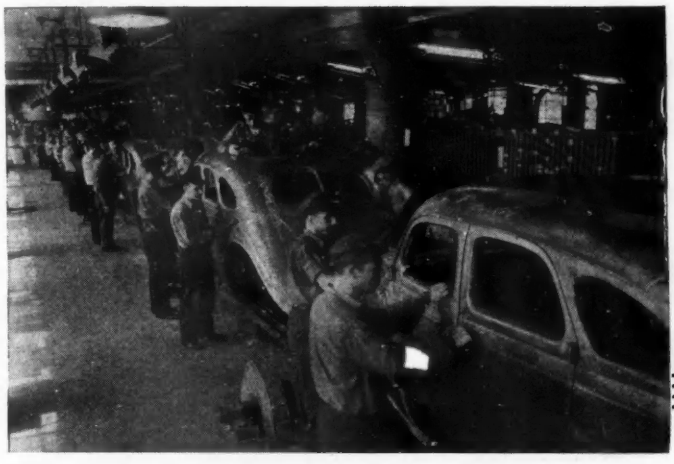
position, applies hydraulic pressure to the guns, and energizes the guns one by one, at a predetermined speed. Advantages of the method are quite obvious. First, the quality of the welds is absolutely assured since each gun is permanently located and operates under a fixed pressure and controlled current flow. Second, the floor-to-floor time is standardized because the operation no longer depends upon human skill. Third, the transformer size for each machine is much smaller than customary because only one spot is made at a time. Finally, tool life is greatly increased and maintenance of tools greatly decreased because the tools are required to do so much less work per operation.

It might be interesting to note in passing that the Airflow department is provided with the following items of welding equipment: 12 hydromatics, 38 arc welders, 12 gas welders, 31 spot welders, 28 portable spot welders, and 12 indirect welders.

Beaucoup Sales in "Them Dish Wheels"

H. J. Klinger, Pontiac president, told this story during his speech at the recent annual convention of the Automobile Trade Association of Maryland:

"Several years ago, when I was associated with what was the largest sales organization in the automobile industry, we were suddenly conscious of a new retail salesman in the company, who was making a phenomenal record. He finished the year, as I recall, among the first half dozen in the United States. We had, at that time, about 25,000 retail salesmen; so you can appreciate the good job he was doing. We wanted to use his photograph in some sales promotion literature, and wrote him for a portrait. This came along, in due time, in a nice brown folder. But before we could use it, we had to have an artist paint a collar and tie on him, comb his hair, and paint the whiskers off his face. One of our men was sufficiently interested in the case to have a field traveler accompany the salesman to see how he operated during a demonstration. The traveler's report was most illuminating. We were, at that time, featuring what we called the 'vision - and - ventilating' windshield, and which we referred to as the VV windshield. We also had disc wheels on our car. This salesman, demonstrating the car, got the prospect off of the right front wheel. With a wide sweep of his arm, he said to the prospect, 'Look at them dish wheels. And look at that there double-five windshield'."



Airflow bodies reach the end of the metal finishing line. Watch the inspector checking door alignment on the body in the foreground

PRODUCTION LINES

Modernization

It took a ghastly bus wreck in New York recently to focus attention upon the need for modern equipment in passenger transportation. As a reaction, both New York and a neighboring State have started a drive which is working hardship on all bus operators, even those with good equipment. Plainly the situation demands quick action on the part of those interested in motorized transportation. Rigid inspection and regular maintenance is one answer. But in many cases, no doubt, the solution lies in bigger scrap piles. Here is a fine opportunity for live bus salesmen.

Two-Way

Prominent consumer research organization urges the use of a two-way analysis of facts which might well be applied to any kind of research project. In consumer research they stress not only "how many" want a thing but also "how much" they want it. The result is a two-dimensional diagram and the comparison is on the basis of area instead of line. "How much" they want it, places the proper emphasis upon the desired feature or variable or thing.

Betters Time

How to better production time on screw machine work is shown in a little report from Union Drawn Steel. The secret is largely in the material you use. With Union free-cut screw steel, the following results have been achieved: 20 per cent increase in output on a screw formed from hexagon stock, 15 per cent increase in producing a round formed cap with an internal thread, 29 per cent increase on a $\frac{5}{8}$-in. hexagon nut blank. Another grade, a high sulfur screw steel, can be used where the machine is capable of taking higher speed and feed. It's all in the steel you specify.

Cost Control

That one of the consequences of the great depression is a stronger emphasis on cost control is the conclusion reached by L. P. Alford, writing in *Mechanical Engineering* for August. He urges the wider use of standard costs as a means of approaching the problem directly and most economically. With standard costs, rather than historical costs, the function of management would be the control and investigation of variations rather than routine procedure. The method has made great headway where applied intelligently. Factory executives may well profit by the adult conclusions of a master in management technique.

American Standard

Thus far American industry has not universally adopted a standard system of fits between cylindrical parts. An American standard was set up in 1925 by the A.S.A. and a committee on revisions appointed in 1930 to study possible changes or additions. Commenting upon these developments, John Gaillard, in *Industrial Standardization* for July, asks, "Can American Industry Adopt the ISA System of Fits?" Whether American industry must follow European practice may be a moot question but it still remains necessary to adopt some system that will assure uniformity of practice as well as maximum economy in the utilization of cutting tools.

Welded Lines

How an aluminum bus body of streamline design was fabricated by welding is told in *Oxy-Acetylene Tips* for July. The framing is of aluminum channels, outer covering of aluminum sheet. All framing joints and sheet fastenings were gas-welded using Oxweld No. 23 Al. Rod. All welded joints were ground down and hammered leaving the exterior perfectly clean and free of seams. The operator claims that this streamlined bus has an economical cruising speed of 61 m.p.h.

Aluminum Lined

Dr. Blue of Dow Chemical recently reported on the possibility of electroplating aluminum on other metals, thus adding aluminum to the list which now includes silver, nickel, chromium, and platinum. Aluminum is electro-deposited from organic solutions.—J. G.

MANUFACTURING MANAGEMENT METALLURGY

The Forum

Mounting Headlamps in Radiator Shell Would Eliminate Their Drag

Editor, AUTOMOTIVE INDUSTRIES:

I have been following with considerable interest the arguments as to what constitutes a "streamlined" automobile. Apparently there seem to be as many conceptions of "streamlining" as there are artists or specialists on the subject.

Irrespective of what idea or ideas are proven in the final analysis to be closest to the most desirable solution both from aerodynamic and appearance standpoints, it would certainly seem to be desirable to reduce to the minimum parasite resistance occasioned by protruding body or car accessories.

Not of the least importance would seem to be the matter of headlights. The time honored method of mounting headlamps on brackets between fenders and radiator shell naturally is an incongruity in any automobile to which the designation of "streamlining" is attached in any form, irrespective of its aerodynamic qualities.

That the industry has been cognizant of this, of course, has already been amply demonstrated, and some attempts have been made to provide these units with something approaching a streamline form. Streamlined mounting brackets are a more general step taken by many. In two cases manufacturers have recessed headlights into fenders—probably excellent aerodynamically but always open to the criticism of costly replacement in case of damage. And in at least two modern cars headlights are recessed into the forward side panels.

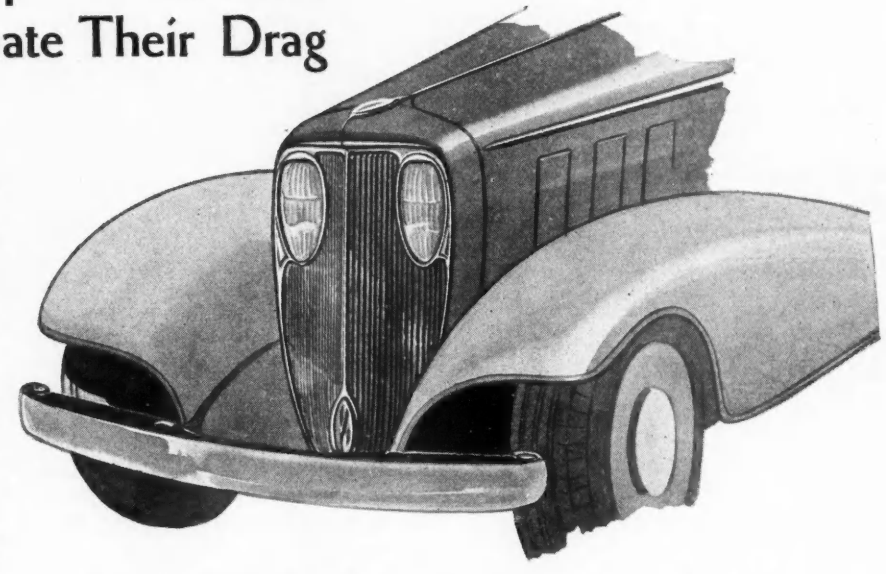


Fig. 1—Suggested method of mounting headlamps in radiator shell or grille

The purpose of this communication is to suggest another possible alternative. I realize that, basically, it is not new. Patents on the general idea date back some 20 years, but the adaptability of the idea to the modern automobile I do not believe has been shown elsewhere. The idea, as shown in Fig. 1, is to mount the headlights within the confines of the radiator shell or grille.

Such an installation would seem to have certain obvious advantages. It would eliminate the eddy-currents amplifying the head-resistance of conventionally mounted headlights. At the same time it permits the design of a highly distinctive and attractive front end. Furthermore if handled with care, the design should enable reductions in manufacturing costs particularly through the elimination of the usually lacquered or chrome plated headlamp shells and brackets.

The radiator shell itself could be fabricated as at present, the major requirement being to add two stamped openings through which the headlamp lenses would project. The reflector can be mounted with inexpensive brackets to the radiator core or grille mounting.

If the objection is raised that such a mounting would locate the

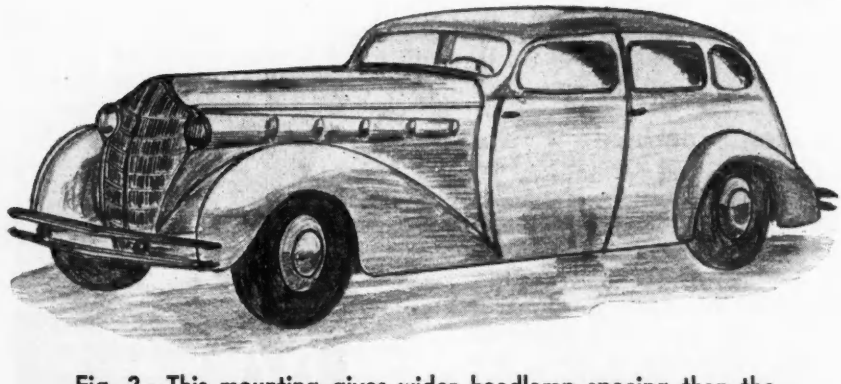


Fig. 2—This mounting gives wider headlamp spacing than the design showin in Fig. 1

headlamps too close together, they can be moved farther apart by bulging the radiator shell to some extent and fairing this bulge back into the hood, tapering it out toward the cowl, as shown in Fig. 2.

Very truly yours,
OTTO WERLE.
Chief Checker, Tool Design
Hudson Motor Car Company.

EDITOR'S NOTE: Mr. Werle's designs are of particular interest in connection with the conclusions reached by M. Andreau as reported in *Automotive Industries*, July 21, 1934, page 74.

An Automobile Transmission Dynamometer

Editor AUTOMOTIVE INDUSTRIES:

There are five ways in which the torque involved in driving a car may be measured. They are as follows:

1. Measurement of engine torque reaction.
2. Insertion of some sort of differential gear in the drive line.
3. Measurement of the angle of twist of the drive shaft.
4. Measurement of the angle of twist of the rear axle shaft.
5. Measurement of the rear axle torque reaction.

Each of these methods involves difficulties, but the measurement of the rear-axle torque reaction seems to be the most convenient. For a car with Hotchkiss drive, it is necessary only to attach the axle housing to the rear springs through antifriction bearings and append an arm, which is restrained by a spring balance or a hydraulic measuring apparatus. The force at the end of an arm of convenient length is of the order of 100 lb., which is easily measured. The effect of friction in the bearings, supporting the spring (if they are of good quality and properly designed), can be neglected. Transfer of torque through the shock absorbers can be eliminated by making the connection between the frame and the spring bolts, instead of between the frame and the rear axle. The rear brake linkage may be disconnected if investigation shows that it may carry torque. Hydraulic brakes should require no change.

If the rear universal joint is not deflected while it is rotating, it can be seen, from symmetry, that there can be no resultant torque on the housing about the rear axle axis. If the drive shaft is deflected in a vertical plane, all the torque vectors involved in action of the joints lie in a vertical plane containing the drive shaft and, therefore, do not affect the rear axle housing.

The torque which the torque arm measures, therefore, is the sum of the two torques acting on the rear axle shafts at their connections to the wheels. These two torques are used to overcome the following forces:

1. Air resistance.
2. Road resistance of all four tires.
3. Grade resistance (if on a grade).
4. Accelerating force (if accelerating).
5. Front-axle bearing friction.
6. Any force involved in towing another vehicle.
7. Front-brake resistance.

The force on the torque arm may be measured in a number of ways, the most practical of which are probably mechanical and hydraulic methods. Damping of fluctuations, which may arise between the torque arm and the measuring instrument, can easily be provided for by the use of a dash-pot or a hydraulic damping device.

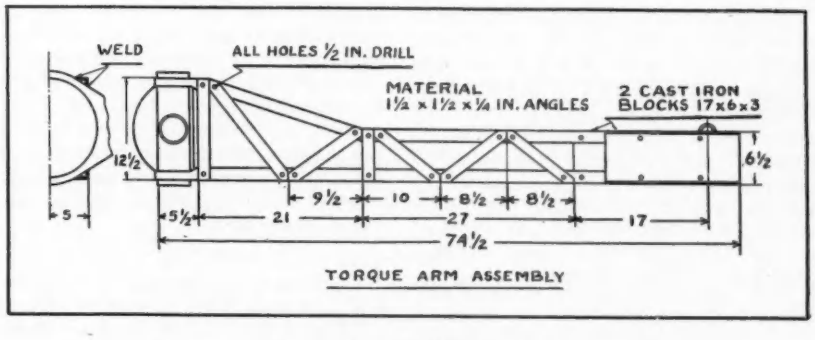
The torque arm and its relationship to the automobile are shown in Fig. 1. The arm is made of 1½-in. x 1½-in. x ¼-in. angle iron and designed to carry the full low-gear torque. This arm is welded to the axle housing, as shown.

The rear axle housing is bored out round, and an annular section, slightly wider than the bearing, is cut through and discarded. The bearings are ground down to allow 11 deg. misalignment and are then mounted on sections of steel tubing and pressed into place in the rear axle housing.

The dash-pot is a small piston operating in a 3-in. cylinder. The cylinder is bolted to the arm and the piston is connected to the frame through a ball and socket joint. Damping is accomplished by the fluid friction of diesel fuel oil as it is pumped by the edges of the piston.

The spring balance is supported at the rear of the windshield by a wooden superstructure, built on a re-inforced floor board.

JOHN WOODBURY LANE



Torque-measuring device

Toughened Glass Adopted By British Manufacturers

TOUGHENED glass, which was introduced on the British market last year by the Triplex Safety Glass Co., Ltd., of Birmingham, is now being used on export models of several British cars. It is claimed for the glass that it does not splinter like ordinary glass but merely crumbles into harmless, blunt-edged, sugar-like crystals. Consisting of only one pane of glass, it can be guaranteed against defects which may arise in laminated types of glass in hot countries, for besides being remarkably strong and flexible, it will resist wide extremes of climate.

How Side Winds Affect Car S

The concluding instalment of M. Andreau's paper in which he discusses determination of resultant wind force and its effect on operation and stability

IN the tests discussed in this part of the paper the two scale models were placed — wheel-to-wheel — between two vertical pivots in the air stream, so they were free to assume a position of equilibrium in the horizontal plane in accordance with the forces acting on them. When the axis of the pivotal mounting was forward of the zero metacenter*, the scale models rested in the wind. If the support was through the metacenter, it was found that the equilibrium was indifferent. As the mounting axis was moved back further, the scale models became stabilized at increasing angles of inclination α. These angles of inclination were measured and recorded.

The aerodynamic balance was modified so as to permit of making weighings both parallel to the air stream and at right angles thereto. Thus for each inclination of the models both the component of the resistance in the direction of air flow and that at right angles thereto were measured, which made it possible to obtain the resultant of the effects of the air current passing through the corresponding metacenter. These components are the C_x and the C_y of conventional wind-tunnel tests, because the model is in its natural position with respect to the relative wind (Fig. 1). The laterally projected area of the car was 51.7 sq. ft. and the coefficient of resistance for a wind at right angles to the axis of the car (C) was found to be 0.0043.

A vehicle following any particular course with respect to the wind is not operating under these same conditions with respect to air resistance. The resultants obtained therefore were projected on the axis of the vehicle and on an axis at right angles thereto, and called C_x and C_y. Thus we obtain the axial and transverse components of the air resistance as a function of the angle of the relative wind (angle of inclination), as well as the metacenters, for a constant relative wind.

If now we assume a wind u blowing transversely across the path of the vehicle at 90 deg., and a speed v of the vehicle, which may be regarded as variable, we see that the velocity of the relative wind changes and is at all times equal to

$$w = \sqrt{u^2 + v^2}$$

Resultants w of a transverse wind and the speeds v of the vehicle were calculated and C_x and C_y were modified accordingly. The values of C_x and C_y now are merely functions of the angle of inclination $u/v = \tan.\ \alpha$ and of the speed v of the vehicle.

Naturally, all the necessary wind tunnel corrections were made, and the values found were brought close to the experimental values by taking account of the Reynolds number, the same as was done previously for the values of C_{xo} (axial resistance).

Analysis of Results—Fig. 2 gives the positions of the metacenters, the angles of inclination, and the angles and values of the resultants for 90-deg. transverse winds such that $u/v = \tan.\ \alpha$.

The reference surface is the frontal surface of the vehicle, S_o, which in this case measures 21.5 sq. ft.

The resultants for succesive angles do not give a regular metacentric curve, as is obtained with simple bodies, which is due to the fact that there is a change in the mode of flow as a function of angle α, as seems to be indicated by Fig. 3.

This diagram gives the values of C_x and C_y projected on the axis of the vehicle and on a line perpendicular thereto as a function of u/v, which we will call x. It gives, moreover, the ratios C_x/C_{xo} and C_y/C_{yo}. It may be seen that for $u/v = 0.8$, C_x passes through a minimum. This point corresponds approximately to the moment when the diagonal of the superstructure of the car is in line with the relative wind. In the vicinity of that position, a change in the flow undoubtedly occurs, due to a change in the direction of the horizontal flow that is set up around the superstructure.

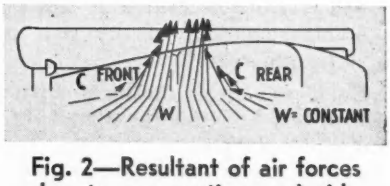


Fig. 2—Resultant of air forces due to car motion and side wind (virtual wind velocity constant

Determination of Resistance—For a velocity v the axial resistance of the vehicle is

$$R_o = S_o C_{xo}\ (u/v)\ (V^2/16)$$

If a cross wind is blowing such that $u/v = 0.5$, for instance, we have $C_x/C_{xo} = 2.55$, hence $R_x = 2.55\ R_{xo}$.

Similarly we have

$$R_y\ (u/v) = S_o\ C_y\ (u/v)\ (V^2/16)$$

Here $C_y = 3.6\ C_{xo}$, and hence $R_y = 3.6\ R_o$.

Under the assumed conditions the axial resistance will be 2.55 times the resistance in still air, and the transverse resistance 3.6 times the latter value.

Note—Every combination of v with any velocity u giving the same resultant as that of our example, will give the same axial and transverse resistances. The matter is self-evident and the composition is easy to effect for any particular case.

Position of Metacenter—With an increase in the angle of inclination, the metacenter moves toward the rear by an amount which we will designate by

* For the benefit of readers not familiar with the subject, it may be explained that the metacenter is the point of intersection of the axis of wind pressure or air pressure on the car, with the longitudinal axis of the car. The zero metacenter is the point of intersection obtained when the direction of the air current makes an infinitely small angle with the axis of the car.—Editor.

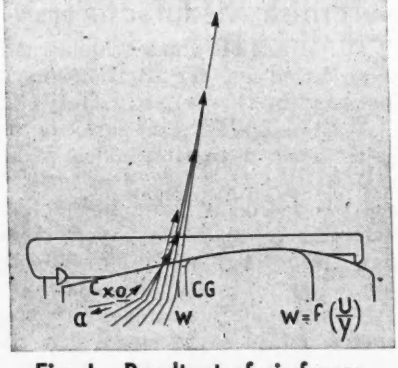


Fig. 1—Resultant of air forces due to car motion and side wind (virtual wind velocity variable)

Stability

Part III

δ, starting from the zero metacenter. This is a very important factor, because upon it depends the moment of the cross wind which tends to disturb the stability of the car. The movement of the metacenter toward the rear may be represented by the following equation:

$$\delta = \frac{x + 1.042\ x^2}{1.56 + x + 1.021\ x^2}$$

It is to be noted that δ is always positive, whether the wind blows from the right or left, and that x must therefore be always greater than zero.

With regard to the position of the metacenter the following facts have been established:

1. The zero metacenter is quite far forward, about one-fifth the length of wheelbase from the front axle. It is very likely that for the Reynold numbers corresponding to regular operating conditions it is even farther forward, so that the values given are slightly incorrect.

2. The 90-deg. metacenter is about as far back as the windshield. That is to say, if the car were free to turn around the corresponding vertical axis, it would assume a position 90 deg. to its direction of running when there is no wind.

3. The center of gravity being located at G, the natural position of equilibrium of the car in the wind is at 75 deg. from the direction of running, rear end forward. Ground adherence fortunately prevents it from assuming that odd position.

Moments of Air Resistance—It is conventional to consider the moment as positive when it tends to turn the body so as to face the relative wind, and vice versa. In the first case the body is aerodynamically stable; in the second case, unstable. What concerns us most is the magnitude of the disturbing moment and whether it tends to bring the object parallel with the wind or to move it farther out of the wind.

The center of gravity may occupy several different positions (Fig. 4).

(a) Ahead of the zero metacenter (stable body).

(b) At the zero metacenter (indifference).

(c) Back of the zero metacenter and ahead of the 90-deg. metacenter (central zone of instability, included between angles of inclination of plus and minus α).

(d) Back of the 90-deg. metacenter (unstable up to u/v = infinity).

This latter case is that of the car.

Assume a point M located a distance d back of the zero metacenter. The moment of the air resistance is

$$C_m = (\delta - d) R_y$$
$$= (\delta - d)\ S_o\ (V^2/16)\ C_y$$

The expression C_y, which changes sign with x, may be written with a fair degree of approximation

$$C_y = 5.42\ x + 1.47\ x^3 - 0.0507\ x^5$$

The expression for the moment as a function of x then is

$$C_m = S_o \frac{V^2}{16}\left(\frac{x + 1.04\ x^2}{1.56 + x + 1.02\ x^2} - d\right)$$
$$(5.42\ x + 1.47\ x^3 - 0.0507\ x^5$$

Of course, these algebraical expressions are not necessary in practical work, in which the diagrams can be used. They are indispensible, however, if one wants to give a stability rating to vehicles, because they permit of determining the coefficient of stability.

Coefficient of Stability of Form—Suppose we eliminate d by making it equal to zero; that is, by evaluating the moments with respect to the zero metacenter. By taking the first differential coefficient with respect to x, we find that the coefficient is zero for $x = o$ (case of Fig. 4). By now taking the second derivative, we find

$$A_o = C_{mo}$$
$$= +6.95, \left(S_o \frac{V^2}{16}\right)$$

which represents the angular acceleration due to the moment of the air resistance around the zero metacenter.

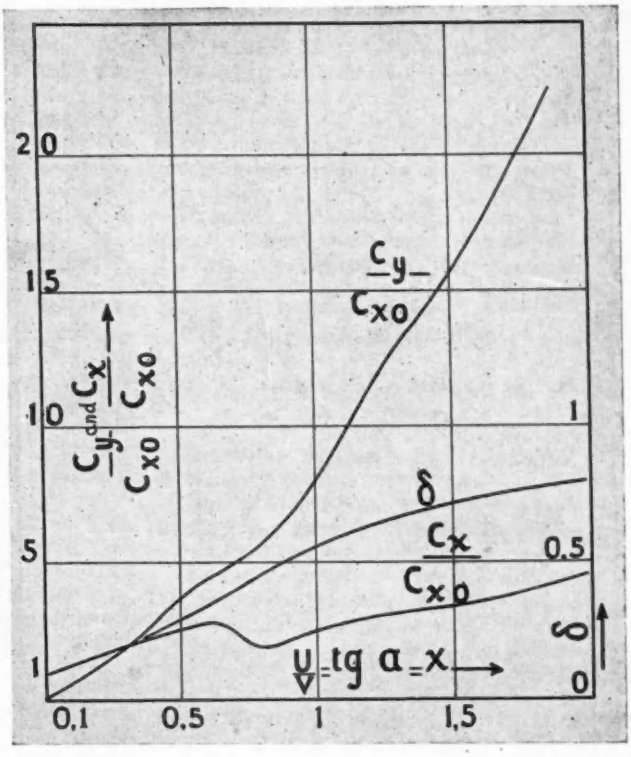


Fig. 3—Variation of air-resistance coefficients with ratio of side-wind velocity to car velocity

This value is independent of the air velocity u, the car speed v, the location of the center of gravity, and the surface of reference; it depends only on the form of the body considered and is an index of its inherent stability.

The value of A_o therefore permits of rating vehicles from the standpoint of aerodynamic stability. It will be seen at once that in an automobile it is desirable to make A_o as small as possible, because actually it is a measure of instability with respect to a given center.

The metacentric curves should therefore open or spread as little as possible.

Stability Around a Point—For the center of gravity

$$A\,(G) = -6.5 \text{ (case of Fig. 4)}$$

Around the differential

$$A \text{ (diff.)} = -14.2.$$

Efforts to reduce the moments yield curves 2 and 3; that is to say, the metacentric curve must be moved back in a certain proportion by restraining the transverse flow toward the rear. If curve 3 is obtained it seems to meet all practical requirements. However, unfortunately, the two following facts have been observed:

1. If C_x is materially decreased, the zero metacenter advances proportionally. For certain profiles, those of least air resistance, this point has been found to be located six lengths ahead of the forward end of the body. The development of the derivative therefore should be the greater the smaller C_x.

2. If a differential coefficient is plotted, the metacentric surfaces, which in general are quite close, open up more, and the values of C_y increase materially. The lever arm is thus decreased but at the same time the active forces are increased. The body is then more sensitive to lateral disturbing forces. It is for this reason that in the

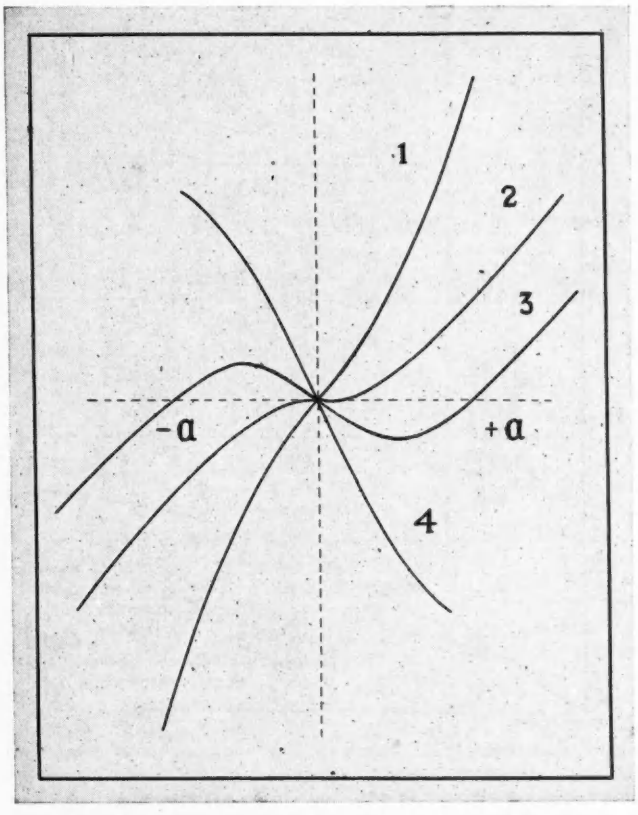


Fig. 4—Position of center of gravity relative to metacenter as a function of the angle of inclination of the virtual wind

(Curve 1, center of gravity ahead of the zero metacenter; Curve 2, at the zero metacenter; Curve 3, back of the zero metacenter and ahead of the 90-deg. metacenter; Curve 4, back of the 90-deg. metacenter.)

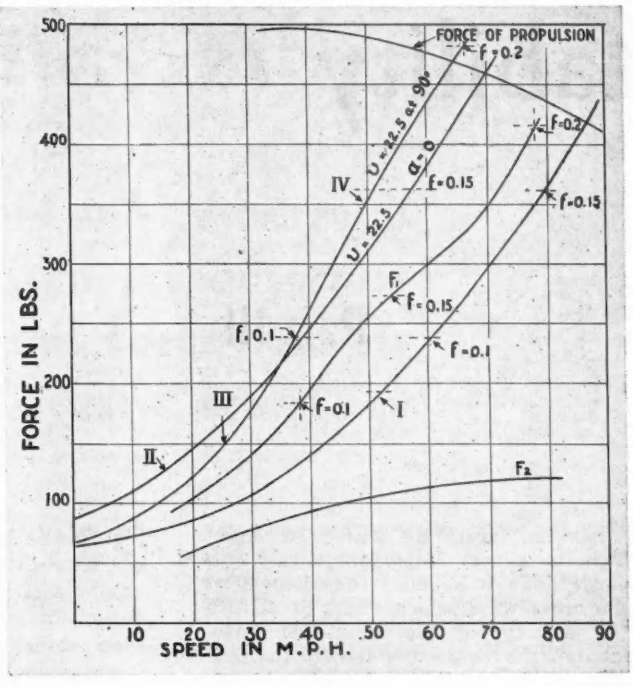


Fig. 5 — Diagram showing the effect of a side wind on the resistance to car motion

case of aerial bombs a degree of equilibrium is aimed at which is just sufficient, because an excess of equilibrium would unduly reduce the accuracy of aim and would render the projectile much more sensitive to lateral disturbances.

The same phenomenon may be observed in the case of a vehicle, and here again it is a matter of making the best compromise, the one best adapted to the charactertistics and the objects of the vehicle. This evidently calls for experimental investigation.

Transverse Forces on Axles—R_y may be replaced by two forces F_1 and F_2 acting on the front and rear axles. If the wheelbase is l,

$$F_1 = \frac{C_m(\text{diff.})}{l} = S_o \frac{V^2}{16} \frac{2.61 - \delta}{l} C_y$$

$$F_2 = R_y - F_1$$

In Fig. 2 the values of F_1 and F_2 are plotted on the basis of a cross wind of 10 meters per second (22.5 m.p.h.).

Influence of Cross Wind on Forward Motion—We will assume the following values: Car weight, 4200 lb. S_o = 21.5 sq. ft.; C_x = 0.00213; u = 10 *m./s.* (22.5 m.p.h.). Power, 102 hp.; transmission efficiency, 95 per cent; rolling resistance, 16 lb. per 1,000.

A—The curve of car speed in still air in Fig. 5 (Curve I), which corresponds to these conditions, shows a maximum speed of 83 m.p.h.

B—With a head-on wind of 22.5 m.p.h., $x = O$, it suffices to add the air resistance corresponding to a velocity of 22.5 m.p.h. to the resistance to motion of the vehicle for any given speed to obtain the new curve II, which indicates a maximum speed of 70 m.p.h.

C—In the case of a 22.5 m.p.h. 90-deg. cross wind, by applying the equations it is seen that the curve III, calculated from the values C_x (u/v), intersects the curve of propulsive force at 65 m.p.h. The chart shows that from 36 m.p.h. on, the car develops a higher speed with a 22.5 m.p.h. head wind than with an equal cross wind.

This suggests a remark with regard to speed tests.

If the test is made on a closed circuit, with a known mean velocity of wind, it is necessary to take into account the different relative values of C_x in all directions, and make a correction for performance in still air. If one has available a polar diagram showing the air resistance coefficients of the vehicle for all directions in the horizontal plane, this can be done by means of a quite simple graphical integration.

It can thus be calculated that a constant wind of 22.5 m.p.h. increases the fuel consumption approximately 30 per cent for the new model car. A 11.25 mile wind, which is very common at ground level, still increases it by 7 to 8 per cent and reduces the maximum speed from 83 to 79 m.p.h.

Taking the arithmetic mean of the speeds is not correct, for the reason that the relative wind speed enters with its square. Moreover, the mean value of C_x for angles x between $+90$ and -90 deg. is not the same toward the front as toward the rear. Such tests therefore should be made in still air (0 to 4 m.p.h.) or otherwise corrected for the mean of the polar diagram as already indicated.

According to observations extending over 5 years, made at the Lindenberg Observatory, the mean wind velocity at ground level is 11¼ m.p.h. Thus the probable performance of a vehicle should be determined in a wind of 11¼ m.p.h. If the calculation is made, the result arrived at is not far from the practical performance of the vehicle in service.

M. ANDREAU said he had weighed in his mind for a long time the question whether he should make public this part of his results, but being convinced that his audience would regard technical matters in an objective spirit, he had decided it in the affirmative.

In a 90-deg. side wind of 22½ m.p.h. and with a variable coefficient of ground adherence f, the rear wheel adherence is completely overcome by the propelling force R_f and the force F_2 perpendicular thereto. The resultant of these two should be less than f p_r where p_r is the load on the rear wheels. Curve III, Fig. 5, shows the limits reached for values of f equal to 0.1, 0.15 and 0.2.

In the same way the limits of f p_1 are marked on Curve F_1. It will be seen that for a coefficient of adherence of 0.15 the rear end of the car skids at a speed of 51 m.p.h. and the front at 55 m.p.h. This phenomenon, however, is of secondary importance, because if the driver takes his foot off

the accelerator he causes the resultant of the forces acting on the rear wheels to come back within the limit of adherence, and the vehicle is stabilized again.

Normal Squall—Average winds are accompanied by squall of 26 per cent. Thus a 20 m.p.h. wind varies normally between 16 and 25.20 m.p.h. If we assume a car to be running on a wet road, with the tires considerably worn, so that the coefficient of adherence is reduced to 0.15 for instance, a figure which is quite common in rainy weather, the driver no doubt will keep below the maximum safe speed of 51 m.p.h., to prevent a rear skid.

Let us suppose that he is driving at 40 m.p.h., which when compared with 51 seems to afford an adequate factor of safety. At that moment he encounters the normal squall, which increases F_1 from 200 to 400 lb. The front stability limit being 275 lb., the front end skids in the direction in which the wind is blowing. All operation of the controls is useless. Application of the brakes would merely intensify the skid, manipulation of the steering wheel would have no effect, and removing the foot from the accelerator would throw only a few pounds of weight from the rear to the front wheels, which weight transfer, moreover, must be multiplied by 0.15, and this would be quite insufficient to stop the skid. To accelerate would intensify it.

In proportion as the vehicle turns, F_1 increases and the movement is accelerated by the momentum of the vehicle. Only the moment of inertia of the vehicle around a vertical axis through the differential opposes the movement. It may be calculated that if the squall lasts even a second, the lateral movement of the forward part of the car is already of the order of 6 ft., which may be enough to pass outside the limits of the diagram.

This will help to explain some accidents in rainy, blustery weather, which are often charged to the tires or the steering gear, but which in reality are due to gusts of wind—a cause suspected by none.

The result depends on the speed of the vehicle (in the case here under consideration the car is safe at speeds below 31 m.p.h.), on the duration of the gust, the moment of inertia of the car, its symmetry, its weight and its form. Thus the effects are highly variable.

It is obvious that the difficulties increase greatly in the case of light and fast vehicles, and particularly in that of racing cars. Cars designed for competition in road races should always have their general aerodynamic characteristics determined before hand, in order to reduce the hazards to a minimum and increase the general safety.

Effect of a Shelter—The car is being pushed sideways by a force R_y, which has the same effect on the control as a corresponding camber. It can be calculated that at the limiting speed of 65 m.p.h., a 90-deg. side wind of 22.5 m.p.h. is equivalent to a camber of 17 per cent in still air.

In the first place, if the steering gear is sensitive to road camber, this is not conducive to easy steering. Besides, the driver must constantly pull on the steering wheel in one direction. If the wind should cease suddenly, the car would instantly head into the wind, by reason of an involuntary movement of the driver's hands, and would lurch to one side.

As soon as the "shelter" is passed the wind starts again, and often with increased force of the squall. This explains why there is great danger of going into the ditch when emerging from a wooded section or on passing the brow of a hill, because since the wind was subdued while passing through the woods or ascending the hill, the car most likely was accelerated.

It can easily be calculated that in such a case the force on the wheels greatly exceeds the limits of adherence at both front and rear, and the front of the car is thrown sideways, because the driver instinctively lifts his foot off the throttle.

Overtaking another car on the lea side may also cause a sudden lurch of the car that is being overtaken toward the other, causing a side swipe, provided the cars are traveling at sufficient speeds, and regardless of the distance between them, which may be quite sufficient for conditions of driving in still air.

Effect on Turns—If the wind comes from the outside of the turn it helps the car to make the curve, and nothing unusual happens. But if it comes from the inside it is a quite different matter. The turn has the effect of reducing the adherence, whatever the natural coefficient of adherence f, and forces F_1 and F_2 add to the centrifugal force.

All that has been said previously with regard to the effects of reduced adherence applies in this case, even in the case of maximum adherence.

This, therefore, is the most dangerous case, and in the future it will no doubt become indispensible to make a careful study of the points involved in pushing back the limits of safety as far as possible. M. Andreau says that in studying this problem he stumbled upon an old empirical rule—at least 25 years old—which is to the effect that in a high-speed vehicle the center of gravity must be located well forward.

Doehler Brastil Die Castings

A new die-casting alloy for which are claimed greater strength and hardness than found in ordinary copper alloys, high resistance to fatigue, shock and corrosion, good bearing qualities and a beautiful pale gold color, has been developed by the Doehler Die Casting Co., Toledo, Ohio. The alloy contains more than 81 per cent of copper.

It is claimed that many automobile parts now made of steel can be made to advantage of this new die-casting alloy, which has strength comparable to that of steel and is rust-proof. Such parts as automobile seat supports, tire brackets, door strikers, and tie-rod brackets are now being made of this alloy and are said to have proven entirely satisfactory. Die castings are of particular advantage for parts of intricate design, since they come very close to dimensions and require no machining. Following are the physical properties of the new alloy, according to the manufacturer:

Tensile strength, 85,000-95,000 lb. per sq. in.

Yield point, 60,000-70,000 lb. per sq. in.

Elongation 8-15 per cent in 2 in.

Brinell hardness, 160-180 (3,000 kg.).

Weight per cu. in., 0.29 lb.

Brastil can be cut, drilled, reamed, tapped and turned with the same facility as other metals of like hardness and toughness. It has high resistance to corrosion, its resistance to acids, alkalies and salts being equal to that of any other copper alloy. As a bearing metal it will withstand higher loads than other copper alloys, the manufacturer claims, and he points out that in Brastil the user has a highly decorative metal of pale gold color which takes a variety of beautiful finishes.

New Airstream Singers Much Like Chrysler Airflow Cars

WHAT is described as the first British production car with streamlined body has been announced by Singer & Co., Ltd. of Coventry. The front of the car bears a striking resemblance to the Chrysler and De Soto Airflow models, the nose being very wide, extending practically to the centers of the fenders on opposite sides and sweeping back in a curve of large radius. The center portion of the front is taken up by a radiator grille, while the headlamps are sunk in the solid side sections. The car also has front seats with tubular frames and a sloping rear not unlike the Chrysler models. There are no pillars between front and rear doors, which facilitates ingress to and egress from the car, and the roof is of the sunshine type. Two other features of the model are a fluid transmission and independent front wheel springing. The spare wheel is carried inside a rear compartment with a door which opens around horizontal hinges at the bottom into a horizontal position, in which position it can be used as a trunk rack.

This Airstream Singer, as it is called, is however not the only choice offered to customers, but is additional to a four-door sedan model on conventional lines, both having substantially identical chassis of 11 hp.

Laboratory Tests Measure

Effects of Changes in Fuel Ratio and Head M

IT has long been known that the tendency of an engine to knock is affected by the size of its cylinders, the materials of the combustion chamber walls, the effectiveness of cooling the hottest parts, such as pistons, spark plugs and exhaust valves, and the speed of the engine. However, the relationships between these various factors have never been expressed in definite figures. Knocking of course is also dependent on the quality (anti-knock value) of the fuel used and on the compression ratio of the engine, and it is possible to measure the effects of the factors previously enumerated in terms of changes in the anti-knock value of the fuel or the compression ratio of the engine required to compensate for them.

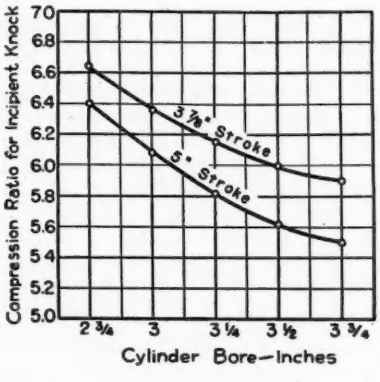


Fig. 1—Variation of maximum useful compression ratio with bore and stroke.

Research work on the relation between certain factors of design and the knocking tendency of the engine has been carried on in the laboratory of the Ethyl Gasoline Corporation, and some of the results obtained were given in a paper by C. D. Hawley and Earl Bartholomew before the American Petroleum Institute at Pittsburgh recently.

The authors divide engines into two classes, L-head and valve-in-head. In a valve-in-head engine, using the same grade of fuel, the same amount of power can be produced with a smaller compression ratio than in an L-head engine. That overheating of such parts as pistons and valves have considerable influence on knock was shown by a series of tests in which these parts were artificially cooled. The engine was then able to work at materially higher b.m.e.p.'s (up to 35 per cent higher), but since the cooling means employed could not be considered for stock engines, this method of boosting output is of little practical value.

To determine the effect of cylinder size on the highest useful compression ratio, a series of cylinders of different bores were made, as well as two crankshafts of different throws, giving strokes of 3⅞ and 5 in. respectively. The bores ranged between the limits of 2¾ and 3¾ in. Tests were made on a single-cylinder engine of the variable-compression type with cast iron cylinder heads, at a speed of 600 r.p.m., with fuel of 80-octane rating. The throttle was fully open, the jacket water was kept at 212 deg. F., the air fuel ratio was adjusted for maximum knock, and the spark advance for maximum power. Results of these tests are given in Fig. 1. It will be seen that the bore has a much greater effect on the highest useful compression ratio than the stroke. The effect of the stroke, moreover, appears to be dependent on the stroke/bore ratio, for whereas an increase in the stroke from 3⅞ to 5 in. decreases the compression ratio of incipient knock by 0.4 when the bore is 3¾ in., it decreases it only 0.24 when the bore is 2¾ in. When bore and stroke are varied in the same proportion the compression ratio of incipient knock seems to vary inversely as $V^{0.21}$ where V is the cylinder displacement volume.

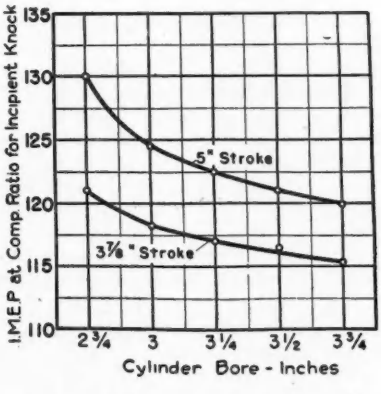


Fig. 2—Variation of i.m.e.p. with bore and stroke when using the maximum useful compression ratio.

Fig. 2 shows the variation of the i.m.e.p. with bore and stroke at incipient knock. It is a rather curious fact that whereas the change in compression ratio at incipient knock due to a decrease in stroke increases less for a small than a large bore, the opposite holds true of the i.m.e.p. This, it would seem, must be due to leakage effects. For instance, for a given bore the leakage area will be the same regardless of stroke, hence the leakage in a given time will be substantially the same, and since the amount of charge in the

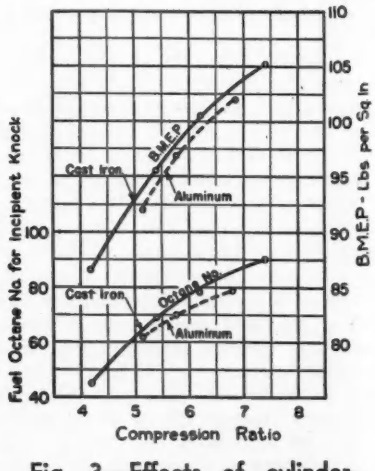


Fig. 3—Effects of cylinder-head material and compression ratio on fuel anti-knock value requirement and b.m.e.p. of a single-cylinder engine.

in Bore, Stroke, Speed Material on Detonation

cylinder is greater with the longer stroke, a smaller proportion of the charge will be lost by leakage in the engine with longer stroke, which will tend to increase its i.m.e.p. relative to that of the short-stroke engine. The leakage factor is apt to be rather pronounced in this case on account of the low speed—600 r.p.m.—at which these tests were conducted.

An investigation was made also with regard to the effect of cylinder-head material on the performance of the engine. As shown in Fig. 3, for a fuel of given octane number, the engine with aluminum

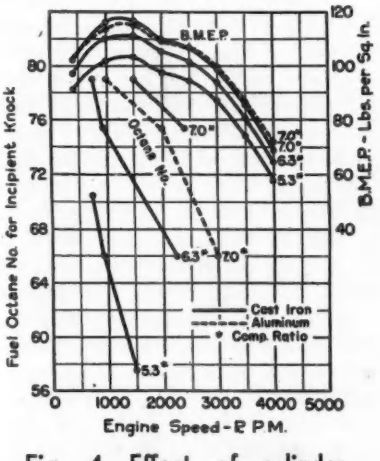


Fig. 4—Effect of cylinder-head material and compression ratio on fuel anti-knock value requirement and b.m.e.p. of an eight-cylinder automobile engine.

head can stand a somewhat higher compression ratio. Also, for a given compression ratio the engine with cast iron head will show a slightly higher b.m.e.p., but this advantage of the iron head is more than wiped out by the higher compression ratio which the engine with aluminum cylinder head will stand, so that when the optimum compression ratios are used in both engines the b.m.e.p. will be somewhat higher in the engine with aluminum cylinder head (97 instead of 95.5 lb. per sq. in. for a fuel of 70 octane rating, for instance).

It is common knowledge that cars have a lesser tendency to knock when they leave the factory than at any later time, which may be due to carbonization of the combustion chamber, rusting of the water jacket, or deposition of salts from cooling water additions. With the single-cylinder test engine the knocking tendency increased during about 200 hours of operation and at the end of this period an 80 octane fuel produced incipient knock, whereas at the beginning a 64 octane fuel could be used. The increase in the tendency to knock in this case was due entirely to carbonization.

That detonation increases as the speed decreases is well known. Fig. 4 shows the relation between speed and octane number of fuel required for incipient detonation; also the effect of cylinder-head materials and compression ratios. The upper series of curves in this chart shows the variation of the b.m.e.p. with engine speed.

An increase in jacket temperature increases the tendency to knock, and it was shown by the tests that an engine which required 74-octane fuel for incipient knock when the jacket temperature was 350 deg. F. required only 69 octane fuel with a jacket temperature of 210 deg. F. This would indicate that within the ordinary range of jacket temperatures—(say 140-200 deg. F.), the effect of jacket temperature on knock is small. With an increase in jacket temperature from 210 to 350 deg. the engine torque fell to 85 per cent of that at the lower temperature.

The effects of changes in fuel ratio on knocking tendency and torque (or b.m.e.p.) seem to be quite similar. A ratio of about 13 to 1 gives maximum torque and also requires the highest octane fuel to suppress knocking, and both torque and octane rating required seem to drop off rather symmetrically for increases and decreases in mixture ratio.

As the temperature of the inlet

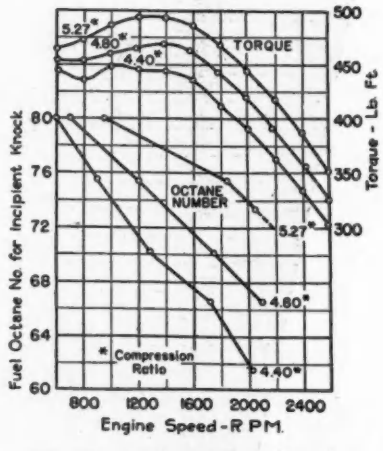


Fig. 5—Fuel anti-knock value requirement and torque of a large multi-cylinder engine at three compression ratios.

air increases the knocking tendency also increases, but only slowly. For instance, a 76-octane fuel gave the same result from the anti-denation standpoint with inlet air at 190 deg. F. as a 74-octane fuel with inlet air at 85 deg. F. The engine torque, however, dropped 10 per cent as a result of the increase of 95 deg. in inlet air temperature.

Quite naturally, the detonating tendency decreases rapidly as the throttle is being closed and the inlet-manifold vacuum increases in consequence. Also, the more the spark is advanced the better the fuel required to prevent knocking.

Fig. 5 shows results obtained in tests with a multi-cylinder commercial-vehicle engine using three different compression ratios.

An increase in compression pressure calls for an increase in the octane number, but a given increase in compression ratio is compensated for by a lesser increase in octane number at low than at high speed.

Control of Flow-Lines Features P

by Edwin F. Cone

ONE of the interesting by-products activities of the Bethlehem Steel Co. is found in the specialty forge department, which is actively serving at least six industries in the production of extruded and similar forgings.

These forgings, which may be put in the specialty class, as distinguished from heavy forgings and drop forgings, are rather interesting and have many unique properties. It is the object of this article to describe briefly the process of manufacture, and the products, which are of special interest to the automotive industry.

These comparatively new products are made by piercing, drawing, piercing and drawing, upsetting and piercing, or extruding steel in dies. In general they may be designated as pierced, drawn or extruded forgings. Extrusion is a factor in most of the operations in that the dies are semi-enclosed or open at the top, where the excess metal has an outlet.

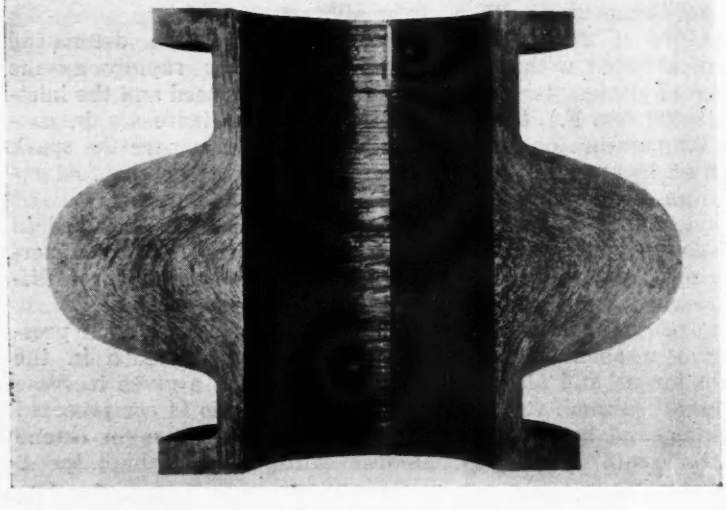
Stock used in making these forgings consists of small billets, blooms or bars of steel, of the analysis suited to the application to which the forgings are intended. Both plain carbon and alloy steels are used—in fact, any composition which can be forged. Among these are nickel, chrome-nickel, chrome-molybdenum, nickel-molybdenum, nickel-chrome-molybdenum, the 4 to 6 per cent chromium-0.50 per cent molybdenum, corrosion-resisting steel and the medium manganese as well as the plain carbon steels.

Each piece or slug, before processing, is nicked and broken to length by the oxyacetylene torch and a gag press, followed by careful inspection of the fractures so that unsound and defective material may be rejected. Previous to forging, the material is pre-heated in gas-fired furnaces where the final temperatures range from 2100 deg. to 2300 deg. Fahr., carefully regulated by pyrometers. Slower heating is the rule when alloy steels are employed, than is the case with plain carbon steels.

The material, thus heated, is dropped into the die—a vital factor in the success of the operations—and pressed to fill the die. The punch of the hydraulic press is then brought

Fig. 1—First stage in the extrusion process. Inserting a hot steel slug into and removing a pierced slug from the die in one of the hydraulic presses

Fig. 3—Flow lines in a hub forging for an airplane



Production of Extruded Forgings

into position and lowered to pierce the hot metal, as illustrated. After removal of the pierced or extruded metal from the die, the product is then slipped over a long mandrel and pushed by means of the hydraulic cylinder of a horizontal draw bench through a series of drawing rings. Thus the wall of the cylinder by this process, varied in its applications, becomes increasingly thinner while the length increases as the drawing operation continues until the tube or final product is made.

As indicated above, the dies are of prime importance. These are generally made of cupola gray iron, high in graphite. They are water-cooled and usually circular in form, and open at the top. Their life averages from 100 pieces to several thousand.

Heat-treating the product, at this stage of the forging process, by annealing at suitable temperatures or by other heat treatments suited to the grade of steel used, is the common practice. This is sometimes done after rough machining. Airplane cylinder sleeves make up a large proportion of the output. These are oil quenched and drawn to a specified hardness after rough machining to within 1/16 in. of the finish dimensions. Most of the extruded products are furnished in the annealed state and some of them receive further heat treatment by the purchaser.

Mention should be made of the directional flow lines which are set up in extruded forgings, clearly emphasized by two of the illustrations. Reasons for the importance of these flow lines, properly coordinated, are manifest to every one conversant with the strength of materials. The flow lines, as set up by this process, are such that the highest combination of tensile strength, elasticity and ductility is induced—such products are superior in physical properties to forgings in which flow lines are not controlled.

Besides the airplane sleeves already referred to, other products of interest to the automotive industry include hub forgings and brake drums for trucks, rear-axle housings, spring seat supports, etc. Judging by experience to date, there are possibilities of other products made as extruded forgings.

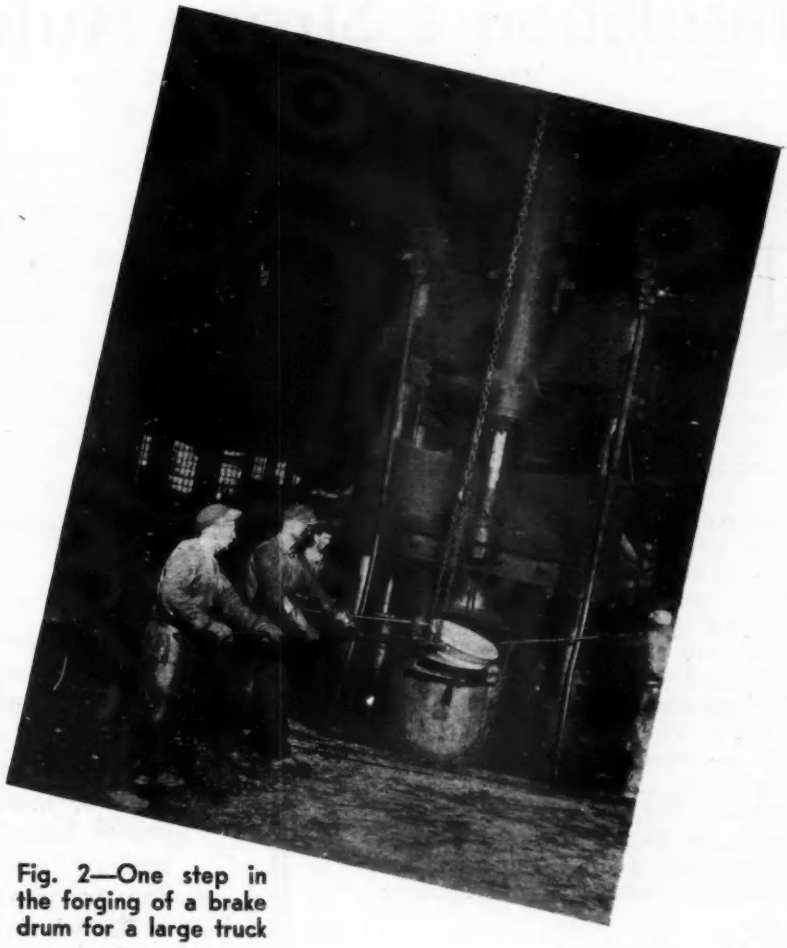
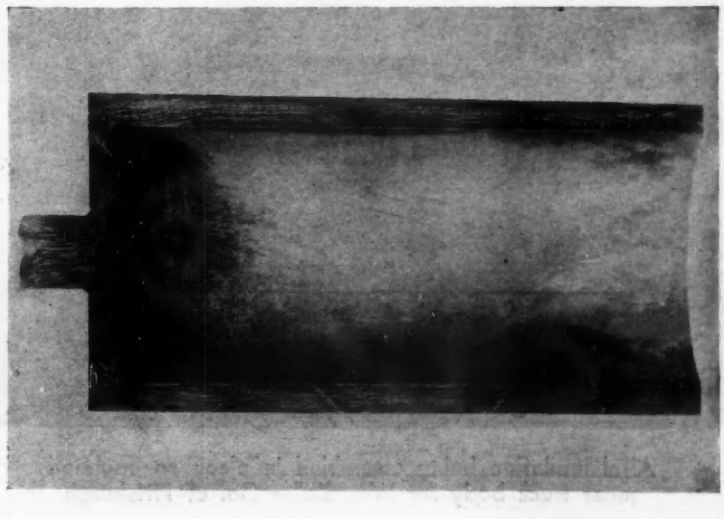


Fig. 2—One step in the forging of a brake drum for a large truck

Fig. 4—Rough-turned cylinder sleeve forging of chrome-molybdenum steel, sectioned and etched to show flow lines



Light Weight Gives Aluminum Foil Heat Insulation a Strong Automotive Appeal

by E. B. Svenson
Engineering Development Division,
Aluminum Co. of America

TESTS have indicated that aluminum foil, properly arranged, possesses excellent heat insulating properties and in addition has a number of distinct advantages such as light weight and resistance to moisture and vermin.

As early as 1925, European engineers had discovered that aluminum foil could be used as insulation by taking advantage of the bright surfaces of the foil which turn back heat in much the same manner as a mirror reflects light. It was found also that the use of successive layers of foil properly spaced, provided the additional insulating advantages of the imprisoned still air.

The weight of this type of insulation is almost negligible which accounted for its early uses in transportation, and which is an important reason for its use in this same field today. Employed on shipboard for insulating bulkheads, refrigerator rooms and steam equipment, it later found use on railroad refrigerator cars, on locomotives for boiler jackets, and on highway trucks.

Uses in this country have paralleled those abroad, except that being a more recent innovation development has not progressed quite so far.

In addition to use with spacers, the foil under the trade name "Alfol"* is now commonly crumpled loosely, which effects the desired spacing at a minimum of cost. Crumpled foil weighs approximately 3 oz. per cu. ft., as compared with 10 lb. of cork.

Application of Alfol insulation may be accomplished in any of several ways, depending on individual conditions and results desired. In cabs of trucks or motor buses, where additional protection from summer sun and winter cold is desired, the foil may be applied directly to the body sheets and secured by means of an asphalt, varnish, or other adhesive.

Where passengers' or drivers' seats are over the motor, suitable insulation can be arranged by providing a subhousing supporting a number of layers of crumpled foil between the motor and the present housing. The optimum insulation in

Aluminum foil insulation is today employed in many capacities in the automotive industry. Among these are insulation for refrigerated ice cream bodies, milk and meat vans, tanks for chilled milk and for hot asphalt, insulation of sides and roofs of motor buses, and insulation over motors beneath seats of passengers and drivers. The accompanying article describes some of these installations and outlines the various methods of application.

Alfol insulation being assembled in place on insulated meat truck body for Wm. Zoller Co. of Pittsburgh

*NOTE: The following patents covering heat insulation with reflective metallic surfaces are owned by Alfol Insulation Company.

U. S. Patents	1,757,479
	1,890,418
	1,934,174
	Others pending
Canadian Patent	274,817
Mexican Patent	26,196

crumpled form is obtained by providing one sheet of crumpled foil for each ⅜ in. of space. Sometimes ribs are used to provide spacing where the use of crumpled foil is inadvisable. If the foil is mounted so that the layers do not touch, ⅜-in. spacing is both practical and economical, although closer spacing provides somewhat better insulation.

It is possible to adapt Alfol insulation to any set of conditions. In commercial bodies, for instance, it is often necessary to apply insulation to protect the products being carried. In the case of refrigerated trucks the cost of refrigeration is high, and ample insulation is the best means of keeping operating costs at a minimum.

In demountable roofs the inner sheathing is mounted on the carlines and the layers of crumpled foil placed between the carlines. For respective spaces of 1 in., 2 in., 3 in. and 4 in. between the ceiling and roof, three, five, eight and ten layers of the crumpled foil are used, or on the basis of a layer for every ⅜ of an inch. The deck material can then be fastened in place. If the sides and roof of the body are framed together, the required number of layers are assembled and raised into place between the carlines after the deck is installed. These are held in position by wires or cords until the ceiling lining is applied. The floor is usually worked from above by placing the required number of layers between the framing members. Since the foil comes in long strips coiled on a mandrel, it requires only to be crumpled and cut into the required lengths to fit any shape or size of area between framing members.

For insulating vertical panels the strips of foil, crumpled or plain, are suspended like curtains from the top sill, either by means of wooden strips, nailed to the wooden sills or by means of wires, which can be threaded through holes drilled in the frames or small clips fastened to the frames.

The only accessories required for its application are screws, nails, wire, wooden strips, materials available in every shop. The Alfol insulation can be fitted into any position, and there is no necessity to design the frame for its special accommodation. This often permits of economies because the framing can be greatly simplified or redesigned for superior rigidity and strength.

No definite cost figures are available for the use of Alfol insulation since this item will vary in accordance with individual conditions. Compared with other well-known types of insulation its cost of installation is relatively low. As no maintenance is required, this item of cost may be erased from the list.

Aluminum foil insulation is so new that no complete statistics can be obtained to show the life of this product. Many installations which are seven years old show practically no deterioration today, and apparently are good for many years to come. Trucks with Alfol insulated bodies which have figured in accidents have been examined, and in every case the foil has appeared in as satisfactory a condition as when it was applied.

First Truck Equipped with New Petrogas Refrigerating System

THE accompanying sectioned photograph illustrates the Petrogas refrigerating system for motor trucks which has been developed experimentally by the Shell Oil Company and will be manufactured and sold in the United States by the McCord Radiator and Manufacturing Co. of Detroit. The photo shows the first truck to be equipped with this system, a two-ton Dodge in the service of S. Loewenstein & Son, packers, Detroit. The truck has a 6 x 6 x 11-ft. refrigerating compartment.

Petrogas is a hydrocarbon similar to propane and is used both as refrigerant and fuel. By referring to the illustration it will be seen that the fuel, carried as a liquid under 135 lb. per sq. in. pressure in twin cylinders A of 23 gal. capacity each, is led up to the heat exchanger B where it is cooled below atmospheric temperature. It then passes through the expansion valve C, from which it issues into the evaporator or cooling unit D as a saturated gas at a pressure of about 5 lb. per sq. in. While being converted from a liquid to a gas it absorbs heat from its surroundings, thereby cooling the truck body. The surface of the evaporator is so proportioned that the gas leaves in a dry state and passes through the heat exchanger B, where it absorbs the "atmospheric" heat of the incoming liquid fuel, as already explained, and then passes through the diaphragm regulating valves E and F, by which the pressure is reduced to atmospheric in two stages. The dry gas then passes on to the McCord mixing valve and thence to the inlet manifold.

The refrigerating effect produced is, of course, in direct proportion to the rate of fuel consumption, 180-185 B.t.u. being abstracted from the surroundings of the evaporator per pound of fuel burned.

In a 7-hr., 120-mile test of the Loewenstein truck, when the outside temperature ranged between 85 and 94 deg. F., the temperature within the refrigerated body ranged between 42 and 46 deg. F., we are informed.

A = FUEL TANKS
C = EXPANSION VALVE
D = EVAPORATOR OR COOLING UNIT
E = 1ST REGULATOR VALVE
F = 2ND REGULATOR VALVE
G = MIXING VALVE OR CARBURETOR
S. LOEWENSTEIN & SON

Dodge 2-ton truck equipped with refrigerating system by McCord Radiator & Mfg. Co.

Retail Unit and Dollar Volume by Price Classes

U. S. New Car Registrations and Estimated Dollar Volume by Retail Price Classes—June

	UNITS					ESTIMATED DOLLAR VOLUME				
	1934	1933	Per Cent of Total 1934	Per Cent of Total 1933	Per Cent Change	1934	1933	Per Cent of Total 1934	Per Cent of Total 1933	Per Cent Change
Chevrolet, Ford and Plymouth	162,938	119,086	72.8	68.4	+35.8	$102,400,000	$ 66,000,000	64.4	57.9	+55.2
Others under $750	6,873	31,010	3.1	17.8	—77.9	4,900,000	20,000,000	3.1	17.5	—75.5
$751-$1,000	45,118	12,933	20.2	7.4	+249.0	37,300,000	11,000,000	23.5	9.6	+239.0
$1,001-$1,500	5,655	7,480	2.5	4.3	—24.5	7,100,000	9,000,000	4.5	7.9	—21.1
$1,501-$2,000	1,587	1,347	0.7	0.8	+18.0	2,800,000	2,000,000	1.8	1.8	+40.0
$2,001-$3,000	1,067	1,714	0.5	1.0	—37.8	2,900,000	4,000,000	1.8	3.5	—27.5
$3,001 and over	386	547	0.2	0.3	—29.5	1,500,000	2,000,000	0.9	1.8	—25.0
Total	223,624	174,117	100.0	100.0	+28.2	$158,900,000	$114,000,000	100.0	100.0	+39.4
Miscellaneous	18	73								
Total	223,642	174,190								

U. S. New Car Registrations and Estimated Dollar Volume by Retail Price Classes—Six Months

	UNITS					ESTIMATED DOLLAR VOLUME				
	1934	1933	Per Cent of Total 1934	Per Cent of Total 1933	Per Cent Change	1934	1933	Per Cent of Total 1934	Per Cent of Total 1933	Per Cent Change
Chevrolet, Ford and Plymouth	722,675	461,945	72.6	67.7	+56.3	$450,400,000	$254,000,000	63.7	55.7	+77.0
Others under $750	51,761	115,365	5.2	16.9	—55.1	36,600,000	75,000,000	5.2	16.4	—51.2
$751-$1,000	172,299	52,992	17.3	7.8	+225.0	141,400,000	46,000,000	20.0	10.1	+208.0
$1,001-$1,500	32,471	33,264	3.3	4.9	—2.4	40,100,000	39,000,000	5.7	8.5	+2.9
$1,501-$2,000	7,946	7,944	0.8	1.2	none	14,000,000	13,000,000	2.0	2.8	+7.5
$2,001-$3,000	5,720	6,915	0.6	1.0	—17.3	15,700,000	17,000,000	2.2	3.7	—7.6
$3,001 and over	2,085	3,168	0.2	0.5	—34.1	8,300,000	13,000,000	1.2	2.8	—36.1
Total	994,957	681,593	100.0	100.0	+45.8	$706,500,000	$457,000,000	100.0	100.0	+54.3
Miscellaneous	164	774								
Total	995,121	682,367								

U. S. New Car Registrations and Estimated Dollar Volume by Manufacturing Groups—Six Months

	UNITS		Per Cent of Total		Percentage of Total Estimated Dollar Volume	
	1934	1933	1934	1933	1934	1933
Chrysler Corp.	227,004	155,414	22.8	22.8	22.9	17.1
Ford and Lincoln	296,173	133,125	29.8	19.5	25.0	20.8
General Motors	381,337	320,834	38.3	46.9	40.8	47.2
All Others	90,607	72,994	9.1	10.8	11.3	14.9
Total	995,121	682,367	100.0	100.0	100.0	100.0

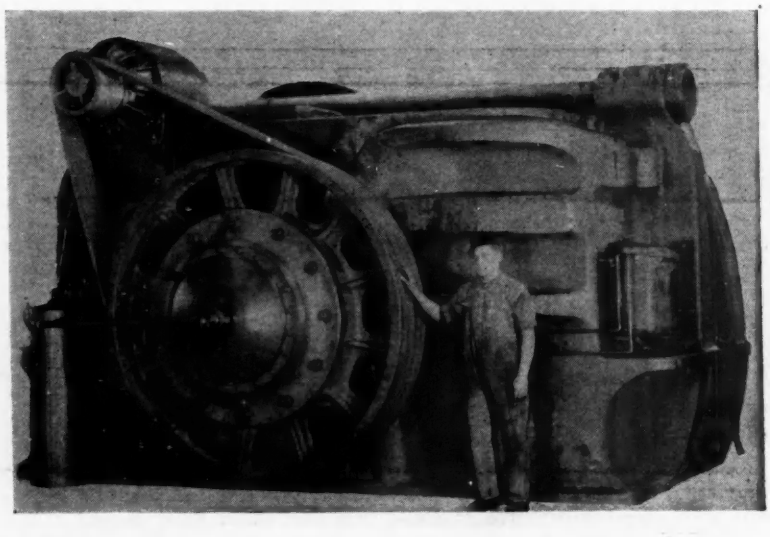
Simplified Clutch for Forging Machines

The National Mach. Co., Tiffin, Ohio, announces a new simplified air-type clutch as alternate equipment for the quadruple abutment starting and stopping clutch used on National Forging Machines. While the positive-type clutch is highly efficient and satisfactory, the pneumatically operated clutch is said to eliminate the noise caused by the pick-up when the clutch block engages the abutment in the gear.

The pressure is applied to the friction disks by a large-diameter air plunger which forces the plates together quickly. Multiple disks of large area are employed in this design of clutch to hold down the unit pressure, and maintain a low temperature, even when tripped at frequent intervals.

When the air pressure is released, compression springs not only expel the used air, but separate the friction plates to reduce wear and heating effect. An extremely small amount of air is required and a very low pressure will operate the clutch efficiently.

In conjunction with this air clutch National employs their "friction-slip relief" as a separate unit to serve as the safety or relief for overloads on the machine. This enables the use of a large-capacity, oversize air clutch, which need not serve the double purpose of a driving means and a slip relief, as generally employed.



A.T.A. Convention Set For Sept. at Chicago

WASHINGTON — According to the A.T.A. Registration Bulletin, the first annual convention of the American Trucking Associations, Inc., will be held in the Hotel Stevens, Chicago, during the last week of September.